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ASPECTS OF THE HISTORY OF ANAESTHETICS*

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I feel that since I am neither a medical historian nor an anaesthetist I owe an explanation to this Section for my choice of subject. The history of the discovery of anaesthesia has been worked over with meticulous care, partly because of the dramatic suddenness with which it occurred, and partly because of the unhappy controversies which marred much of the history of this remarkable advance in human knowledge. The subject, therefore, is not merely well-trodden ground, but, as regards the pitfalls and entanglements with which it abounds, is as uninviting as some abandoned battle area. None the less I venture upon this dangerous field because the whole subject has great interest for the pharmacologist.

Pharmacology is one of the youngest of the medical sciences; it is, indeed, a growth chiefly of the twentieth century, and in consequence has very little history. Only three discoveries of major importance to pharmacology were made in the nineteenth century—namely, anaesthetics, antiseptics, and endocrine therapy—and of these only the first is favourable for historical survey.

Endocrine therapy was initiated by the discovery of the action of thyroid, which constituted the beginning of a new branch of science, but this subject is still developing at great speed; it obviously is not yet approaching maturity, and hence is at present unsuited for historical treatment. Antiseptics suddenly assumed a dominant importance in surgery, but the development of aseptic technique caused their importance to decline as rapidly as it had grown and their history is too irregular to be of general interest.

The discovery of anaesthetics is the only pharmacological advance of major importance made in the nineteenth century that has reached mature development and therefore can suitably be treated from the historical aspect.

The importance of this discovery for the history of pharmacology is further increased by the fact that this was the first occasion on which the synthetic products of the organic chemist were used to produce a therapeutic effect of major importance. Since then the use of such compounds has developed steadily, and to-day they form the chief basis of therapeutics. Modern pharmacology may therefore be said to have begun with the introduction of anaesthetics, and indeed the only later events of comparable importance in the history of the science are the introduction of thyroid therapy and the discovery of salvarsan, which respectively initiated the sciences of endocrinology and of chemotherapy.

These are adequate reasons for a pharmacologist taking a special interest in the history of anaesthesia, and a general survey reveals outstanding facts that are of great importance in relation to the problem of how a profession reacts to the impact of new ideas and a new technique. It is, moreover, of interest to study the course of discovery and to note the points at which progress was rapid and those at which halts occurred, since such a study gives hints regarding the factors which influence the advance of scientific knowledge.

Sudden Discovery of Surgical Anaesthesia

A casual survey of the discovery of anaesthesia suggests that it took place with almost explosive rapidity. In 1844 Wells produced surgical anaesthesia with nitrous oxide, in 1846 Morton did the same with ether, and in 1847 Simpson introduced chloroform. In September, 1846, the possibility of surgical anaesthesia was not generally recognized; by the end of November, 1847, chloroform and ether were in widespread use, and both nitrous oxide and ethyl chloride were known to be possible anaesthetics. In 1846 the only mention of anaesthesia in the *Lancet* was a short note on the new use of ether in the last number, while less than four months later (April 10, 1847) the editor referred to ether as "a remedy which has already produced such an unparalleled influence on the practice of surgery in this country," and mentioned that the number of operations had doubled. Throughout 1847 the *Lancet* maintained a special column describing "operations without pain."

The essentials of modern anaesthetic practice were therefore mastered almost within a year. Many advances have been made since then, but it will be generally agreed that ether, nitrous oxide, and chloroform are together more important than all other known agents. An anaesthetist could manage better if confined to the three agents mentioned than he could if deprived of these three and allowed his choice of all others.

This period of remarkable advance was followed by a long period of quiescence, and it is only during the last fifteen years that a really active search for new agents has begun again.

More detailed examination of the development of knowledge shows that it was not quite so abrupt as suggested above, but none the less the suddenness of the initial advance is the outstanding feature in the history of anaesthesia, and the factors that caused this phenomenon are of obvious interest.

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Factors Leading to the Discovery

The advance was essentially the mastery of a successful technique. There are two easily recognizable types of advance in knowledge. In one case something new is discovered the existence of which had previously been unsuspected; for example, the discoveries of *x* rays and of radium. The other case is when the aim is obvious but the means of attainment are lacking, and the advance consists in finding the right technique. The discovery of anaesthesia was of this latter kind, for the alleviation of the pain of operations was an obvious aim indicated by ordinary motives of humanity, and since classical times medicine had been acquainted with the stupefying power of many drugs. Sir J. Y. Simpson (1871) pointed out that there was evidence of the regular use of stupefying agents such as opium and mandragora in both classical and mediaeval surgery. Curiously enough, this knowledge appears to have been lost at about the Renaissance period.

The essential importance of establishing an efficient technique will, I think, explain the history of the oldest of the anaesthetics—namely, nitrous oxide—though at first sight this history is very surprising.

Nitrous Oxide

The discovery of the pharmacological actions of nitrous oxide is of special local interest, since it is closely associated with the West of England. Sir Humphry Davy, who was born and bred near Penzance, began studying for medicine by being apprenticed to a surgeon apothecary in Penzance, but in 1798, when 20 years old, he went to work under Dr. Thomas Beddoes at the Medical Pneumatic Institution in Bristol. After two years of work (1800) he published his *Researches, Chemical and Philosophical, chiefly concerning Nitrous Oxide*. This volume is a model of a pharmacological research complete in all its stages. It starts with a masterly investigation of the chemical properties of nitrous oxide, proceeds through a series of well-planned pharmacological researches upon a wide variety of animals, continues with an investigation into the actions of the gas on man, and concludes with a brilliant deduction regarding its therapeutic value. On the last point Davy's actual words were (p. 556):

"As nitrous oxide in its extensive operation appears capable of destroying physical pain, it may probably be used with advantage during surgical operations in which no great effusion of blood takes place."

The only criticism to be made of these experiments is that Davy took somewhat extreme risks with his own life, since he repeatedly inhaled nitrous oxide to the point of unconsciousness and proved that the gas "could be respired without danger by a human animal for a much longer time than that required for the death of smaller quadrupeds in it." Among his many discoveries was the demonstration that pure nitrous oxide produced death in animals, but that unconsciousness, with subsequent revival, could be produced by nitrous oxide mixed with a little oxygen or ordinary air.

Davy's brilliant researches bore no immediate fruit. Hickman (Wellcome Museum, 1930), a country practitioner in Shropshire, made a series of attempts in 1824 to produce surgical anaesthesia by inhalation of gases. He published a pamphlet showing that dogs could be rendered unconscious with carbon dioxide, could be operated on in this condition, and afterwards recovered. In a memorial to Charles X (1828) he stated that anaesthesia could be produced by certain gases. The memorial was referred to a commission of the Académie Royale de Médecine, but the only member interested was the famous Baron Larrey. Nineteen years later the rapporteur of this commission (Gérardin) stated that nitrous oxide was one of the gases mentioned by Hickman. The latter died in 1829, aged 29, having received no encouragement either in England or in France. He certainly demonstrated the possibility of producing surgical anaesthesia by the inhalation of carbon dioxide, but the extent to which he investigated nitrous oxide is doubtful.

Neglect of Davy's Work on N_2O

The use made of Davy's brilliant researches does not increase one's respect for human intelligence, since the suggestion about anaesthesia was almost completely ignored for forty years, while the fact that nitrous oxide produced a ludicrous form of intoxication was eagerly seized upon and exploited. Progress, however, occurs through unexpected and unpromising paths, and these silly demonstrations proved of ultimate value. Horace Wells, the surgeon dentist of Hartford, Connecticut, saw one of these displays of laughing-gas, and on December 11, 1844, arranged for the gas to be used upon himself, and achieved the painless extraction of a tooth under anaesthesia. Apparently he had never heard of Davy's suggestion. Wells tried to demonstrate the use of gas at Massachusetts General Hospital, but the demonstration was a failure, and the sensation attending the discovery of ether anaesthesia two years later caused nitrous oxide to be neglected and forgotten. In 1863 Colton in New York popularized the use of pure nitrous oxide in dental operations, and in 1868 Edmund Andrews of Chicago showed the advantages of using nitrous oxide with 10 per cent. of oxygen—a method that Davy had investigated on animals nearly seventy years previously. Nitrous oxide was established in general use in Great Britain about 1870.

In view of the present importance of nitrous oxide this history is very extraordinary. It would appear that Davy established the possibility of anaesthesia with gas and oxygen, that this invaluable discovery was completely neglected for forty years and its true value not established for seventy years, while in the intervening period the gas maintained a steady popularity in virtue of its power to produce a ridiculous intoxication.

Before judging such apparent stupidity too harshly it is well, however, to consider the probable limitations imposed by imperfections of technique. The genius of Davy was unique, and although he could produce nitrous oxide pure enough to permit him to inhale it repeatedly to the verge of unconsciousness, yet it is probable that few others had a similar skill. For example, in 1847 Orfila gave the following account of his experiments with nitrous oxide (Hickman, 1930):

"J'ai répété leurs [Davy *et al.*] expériences, et j'en ai éprouvé de si vive douleur dans la poitrine et une telle suffocation, que je suis resté convaincu que si j'eusse continué l'expérience, je n'en serais pas revenu."

Nunneley in 1849 came to a similar negative conclusion, for he experimented on some 300 cats with a wide range of possible anaesthetics, and concluded that his experiments were "quite sufficient to show that nitrous oxide never could be employed as an anaesthetic and that the inhalation of it is not altogether so harmless as is generally stated."

It must have been very difficult indeed to produce a satisfactory nitrous oxide anaesthesia when the gas available was of doubtful purity and the most portable form of container was a balloon. There are therefore circumstances palliating the failure of the medical profession to utilize the gift which Davy offered them, but, even so, one cannot claim that the history of nitrous oxide redounds to the credit of anyone except Davy and Wells. Indeed, an enemy of our profession might claim that it showed extreme slowness and conservatism in accepting the gift offered by science.

Ether Anaesthesia

The history of ether contrasts sharply with that of nitrous oxide. Ether was one of the earliest known of the synthetic organic drugs, and its synthesis was

described by Valerius Cordus in 1546. In 1794 Dr. R. Pearson used it in the treatment of phthisis (Gardner, 1847) and suggested its investigation to Beddoes. After a few trials at the Pneumatic Institute it was found to be serviceable as an anodyne. Apparently its intoxicating powers soon became fairly common knowledge. Dr. Graham, of "celestial bed" fame, was accustomed about 1802 to inhale ether several times a day (Lee, 1847). In 1818 a note believed to have been written by Michael Faraday was published which pointed out that ether had intoxicant effects similar to those of nitrous oxide.

The medical profession was therefore fairly well acquainted with the intoxicant action of ether, and many persons probably knew that excess of ether might lead to unconsciousness. In 1844 Jackson and Morton witnessed Wells's abortive demonstration with nitrous oxide, and in 1846 Morton used ether for the painless extraction of teeth. On October 16 he administered ether for a surgical operation in Massachusetts General Hospital. Morton was more fortunate than Wells; his public demonstration was a complete success, and the speed with which its fame spread round the world is truly remarkable.

On December 19, 1846, a tooth was extracted under ether in London, and two days later the drug was used for two operations performed by Liston at University College Hospital; within a few days the fame of ether had spread to Edinburgh and to Paris. Sir J. Y. Simpson (1847a) immediately (January 19, 1847) used ether to relieve the pain of childbirth, and within three months it had revolutionized surgical practice in Great Britain.

Reception of the Discovery

The manner of the reception of the news of the discovery of anaesthesia in Great Britain is thus described by a contemporary (Miller, 1848):

> "It fell on no dull or idle ears. It was taken up, tried, and speedily re-echoed; and in a few days it filled the island. The profession were surprised, excited, charmed in the mass; and more especially those on the sunny side of the grand climacteric. The elderly gentlemen had their preconceived and heretofore settled notions sadly jostled and disturbed; not a few grew irritable, and resented the interference, but the thing was too fast, the first impulse too strong, and the promoters too numerous and nimble to be so obstructed."

In the case of nitrous oxide it was necessary to explain and palliate the inertia of our profession, but the history of the reception of the discovery of ether is wholly creditable, for its use appears to have sped round the world as fast as the posts could carry the news.

The contrast between the fate of the two drugs suggests a kind of all-or-none effect where a discovery depends on the attainment of an adequate technique. In such a case if the results are immediately convincing and obvious, and the introduction is attended with reasonable good fortune, the discovery attains a momentum that sweeps away opposition. If, on the other hand, there are hitches owing to imperfect technique or mere bad luck, then a discovery of comparable importance may peter out and be forgotten for a generation.

The introduction of ether as an anaesthetic was attended by many unfortunate circumstances on which it is unnecessary to dwell. There was a quarrel between Jackson and Morton, an attempt at secrecy and a patent. All who are condemned to survey modern medical literature will sympathize with the bad luck of Crawford W. Long, a rural practitioner in Georgia who in 1842 used ether to produce anaesthesia in several operations. He had been so impressed by the injunctions of his professors not to swell medical literature by premature publication of incompletely verified work that he did not publish his results until 1853. Hence the most laudable of motives caused him to miss much well-deserved fame.

Incidentally the attempt to take out a patent was eagerly seized upon as a pretext for opposition to a new idea. The following was the reaction of the *Philadelphia Medical Examiner* to anaesthesia in December, 1846 (Hoff, 1937): "We are persuaded that the surgeons of Philadelphia will not be seduced from the high professional path of duty into the quagmire of quackery by this will-o'-the-wisp." After a passing reference to the ethics of using a patent medicine and a lament for the decadence of Boston, the editor concluded that "physicians and quacks will soon form one fraternity."

The credit for the discovery of ether was a subject of prolonged inquiry and controversy, but the matter was well summed up by Jacob Bigelow in 1870 in a letter to Simpson (1871): "As far as we know, he [Morton] is the only man, without whom anaesthetic inhalation might have remained unknown to the present day." I feel that this is the final criterion in apportioning credit for an advance. Discoveries are scarcely ever the sole work of one person. All research workers stand on the shoulders of their predecessors, and if current knowledge is adequate to suggest a possible advance to one person, it is nearly certain that the same idea will have occurred to many others. There is, however, a world of difference between a bright idea and a successful achievement, and the main credit must always go to the man who possessed the energy and determination and skill to demonstrate the possibility of progress along some new path.

Chloroform

The discovery of chloroform was the third outstanding event in the discovery of anaesthesia. The trial of chloroform by J. Y. Simpson and his friends, and its successful use as an anaesthetic for major operations at the Royal Infirmary of Edinburgh on November 15, 1847, are celebrated historical events. The first operation was performed by Professor Miller, and was witnessed by Dumas the chemist and by Christison. There has been debate on the extent to which Simpson was helped or even anticipated by others, and since this is a matter of special interest to Edinburgh, I feel justified in digressing briefly to discuss this point.

Christison (1886) in 1868 wrote the following account of his colleague's achievement:

> "In 1832 Soubeiran in Paris and Liebig in Germany simultaneously discovered chloroform. In 1835 Dumas ascertained its leading physical and chemical properties and its correct elementary constitution. In 1838 Dr. Formby of Liverpool first used it as a medicine inwardly as a soothing antispasmodic. In 1842 Dr. Mortimer Glover, a young Edinburgh graduate, discovered by experiment that it is a powerful narcotic poison, and that one of its effects as such is to produce insensibility."

Gilmour (1908) states that Dr. Black of Bolton used chloroform as a medicine in 1833. It is said that Glover tried chloroform on human subjects (Davidson, 1908). Furnell, working under John Bell and Co., London, is said to have experimented on himself in the summer of 1847. Christison states that in March, 1847, the French physiologist Flourens proved that the inhalation of chloroform causes in animals precisely the temporary anaesthesia caused by the inhalation of ether.

Events Leading to its Use

Christison also made the following statement in 1870:

> "On asking Dr. Matthews Duncan to repeat a remarkable statement he made to me a few months ago, relative to his concern with the discovery of the anaesthetic virtues of chloroform, he gave it to me thus. One day when Sir James Simpson and he were in Dr. Gregory's laboratory at the College, he (Dr. Duncan) got possession of every liquid in the laboratory which he imagined 'would breathe.' Four or five bottles were thus carried off, and chloroform was one. At this time the correspondence with Mr. Waldie about anaesthesia and the suggestion by that gentleman to try chloroform had not been heard of by Dr. Duncan. One forenoon Dr. Duncan made trial of the chloroform. He had previously

experimented on himself with various substances, but found none suitable. On trying chloroform, he was convinced that the article sought for was found. The same or next evening the trial was repeated by Dr. Keith, Sir James, and himself. This was the trial which is now a matter of history; but the previous trial has never been noticed."

Dr. Duncan was at that time assistant to Sir James Simpson in his scientific work, and undertook this special inquiry under his general guidance. With regard to the earlier trials noted above, it may be mentioned that the only commercial form in which chloroform was available was a weak alcoholic solution termed "chloric ether," and this was used in most cases.

The David Waldie mentioned above, who was chemist to the Apothecaries' Company in Liverpool, devised a method of separating pure chloroform from chloric ether. On November 29, 1847, he gave the following account at Liverpool of the manner in which he suggested the use of chloroform to Simpson:

"The vapour of the so-called chloric ether seems to have been tried as a substitute for sulphuric ether in February or March last,* but without very satisfactory results, which indeed could scarcely be expected, unless the vapour of alcohol possessed the same properties, it being composed principally of alcohol. When in Scotland, in October last, Dr. Simpson introduced the subject to me, inquiring if I knew of anything likely to answer. Chloric ether was mentioned during the conversation, and being well acquainted with its composition and with the volatility, agreeable flavour, and medicinal properties of chloroform, I recommended him to try it, promising to prepare some after my return to Liverpool, and send it to him. Other engagements and various impediments† prevented me from doing this so soon as I should have wished, and in the meantime Dr. Simpson, having procured some in Edinburgh, obtained the results which he communicated to the Medico-Chirurgical Society of Edinburgh on the 10th of November, and which he published in a pamphlet entitled: 'Notice of a New Anaesthetic Agent as a Substitute for Sulphuric Ether in Surgery and Midwifery.'"

Simpson wrote in a footnote to the pamphlet mentioned that Mr. Waldie had named chloroform to him as worthy among others of a trial. Waldie emphasized the fact that he had played only a small part in the discovery of the anaesthetic properties of chloroform, but thought that Simpson might have been more generous in his recognition of this help, since he had recommended the trial of pure chloroform, which at that date was not known as a commercial article.

These accounts suggest that Simpson was, as Waldie complained, somewhat economical in his recognition of the help he received both from Waldie and from Matthews Duncan. Nevertheless the popular tradition that associates Simpson's name alone with the introduction of chloroform would appear to be substantially correct. The discovery of surgical anaesthesia was not a revolution in ideas, but the attainment of a goal which others had striven for without success. After the establishment of ether many persons up and down the country were trying out all likely volatile fluids. The essential advance was not the idea of trying chloroform but the provision of proof that not only did it produce anaesthesia but that in some respects it appeared to be superior to ether.

Simpson also seems to have the honour of being the first to use anaesthesia in labour, but this advance was almost inevitable after the discovery of anaesthesia, and the question who was first is not important. It is indeed probable that the witch-cult were the real pioneers in the production of "painless labour." They appear to have retained the knowledge of the use of narcotics to produce coma which was common in mediaeval times and lost at a later date. The descriptions of the composition and the use of their "flying ointment" establish this point fairly clearly. They appear also to have used such drugs to relieve the pains of childbirth. Unfortunately the accounts of the witch trials are such a medley of fact and fiction that one cannot draw from them any certain conclusions. For example, Agnes Sampson of North Berwick was accused of having taken away the "natural and kindly pains of labour" from Euphemia MacCalyan of Edinburgh, and this suggests the use of narcotics; but the account proceeds to state that the pains were cast upon "the wanton cat of the house," which vanished. At the time of the trial the evidence was deemed completely convincing, and both women were burnt alive in 1591, but to-day it is obviously difficult to decide how much, if any, of the tale was true.

Chloroform attained immediate popularity, but it is of interest to note that it narrowly escaped an initial disaster, which might have prevented its employment for decades.

Immediate Success of Chloroform

Chloroform was first used for an operation at the Royal Infirmary, Edinburgh, on November 15, 1847. A test had been arranged two days previously, but Simpson could not attend, and therefore chloroform was not given on this occasion. The operation was for hernia, and the patient died when the first incision was made through the skin (Simpson, 1852). It is very probable that the same tragedy would have occurred if chloroform had been used, when it would certainly have borne the whole blame, and the incident shows how much the initiation of a new therapeutic measure may depend upon good fortune.

Chloroform made such an easy success that at first it seemed that there would be no scope for Simpson's zest and talent for controversy. This, however, was provided for him by the action of certain ministers and medical men who claimed that relief of the pains of childbirth was contrary to the Scriptures. Possibly these ministers hoped to revive some of their old triumphs of the seventeenth century, when the number of midwives they caused to be burnt as witches must have formed a considerable proportion of those practising this profession. Times had changed, however, and it is only fair to the churches in Scotland to record that Dr. Chalmers gave the opinion that if some "small theologians" really took such an improper view they were too foolish to merit serious attention. Simpson, however, plunged with delight into the controversy; he fought his opponents on their own ground—namely, the interpretation of the biblical texts—and scored a fairly easy triumph.

Far longer and more serious was the controversy between Boston and Great Britain over the relative merits of ether and chloroform. This controversy practically ended in 1871, when the *British Medical Journal* threw its great influence on the side of ether.

Investigations of Deaths from Chloroform

Deaths from chloroform soon occurred, and the first case (January 28, 1847) happened to be typical. A girl of 15 had had one great toe successfully removed under ether, and two months later chloroform was given for the removal of the other one. The patient died suddenly within two minutes of the beginning of anaesthesia. The occasional occurrence of sudden and wholly unexpected deaths of this type under chloroform naturally attracted much attention. The history of the investigations made upon this subject in the ensuing sixty years provides chastening reading for laboratory workers, because the early clinical observers at once divined the nature of the phenomenon, while the laboratory workers in later years were persistently at fault.

In 1848 Sibson analysed the first four deaths from chloroform, and concluded: "In all the four cases it is manifest that the immediate cause of the instantaneous death lay in the heart." In February, 1849, it was noted in a case of chloroform death that the blood ceased to flow before the respiration stopped (Nunneley, 1849). Snow (1858) made a masterly analysis of fifty cases of death from chloroform, and showed that in at least forty of these cases death was due to cardiac syncope and not to overaction of chloroform on the brain or medulla.

* Presumably the experiments referred to by Christison.
† His laboratories were burnt down.

Deaths under chloroform attracted so much attention that committee after committee was appointed to investigate their cause, but the reports chiefly serve to provide a striking proof of the fact that committees are not an effective mechanism for the solution of scientific problems.

A commission which reported to the Society of Emulation of Paris in 1855 concluded that in all instances in which animals were killed by chloroform the action of the heart survived the respiration (Snow, 1858). The Hyderabad Commissions (1888, 1889) concluded that there was no such thing as chloroform syncope and that the heart was the last organ to give in under the action of chloroform (Lawrie, 1891). The *Lancet* (1889) pointed out, however, that this conclusion was opposed to those arrived at by the previous commissions appointed by the Royal Medical and Chirurgical Society and by the British Medical Association. A later commission set up by the B.M.A. (1903) nevertheless directed all its attention to the question of overdosage of chloroform.

In 1908 the Commission on Anaesthesia of the American Medical Association concluded that "all of the accidents of chloroform are due to overdosage" (Haggard, 1908). These commissions included many distinguished physiologists. Their conclusions were perfectly correct as regards the subject they studied—namely, the effect of gross overdosage of chloroform—but unfortunately this has no relation to death in the early stages of chloroform anaesthesia. It is difficult to believe that any of these commissions could have studied Snow's excellent treatise. In this he describes fully the manner in which overdosage of chloroform kills an animal, and then remarks:

> "In examining the recorded cases of fatal inhalation of chloroform, we shall find, however, that they have none of them taken place in this gradual manner; but that in all cases the fatal symptoms, if not the actual death, have come on very suddenly."

This history illustrates clearly an essential limitation of laboratory methods; like most methods of exact analysis, they yield peculiarly ridiculous results unless they are directed to the correct object. The prolonged failure recorded above has since been redeemed, and to-day it is possible to produce cardiac syncope with chloroform as a laboratory demonstration.

Other Anaesthetic Agents

The discovery of ether and chloroform stimulated intensive research into the properties of other gases and volatile liquids. As already mentioned, Flourens in 1847 described the anaesthetic action of ethyl chloride as well as chloroform. In 1848 Nunneley investigated on cats the anaesthetic action of numerous substances, and incidentally described the effects produced by a mixture of ether and an alcoholic solution of chloroform (A.C.E. mixture). Workers such as Nunneley, Snow, and Richardson examined the anaesthetic properties of a wide variety of gases and volatile liquids. Some of these, such as ethylene, afterwards became established. The general rule that "the good is the enemy of the best" came, however, into operation: nothing was found which showed a clear superiority over chloroform or ether, and in consequence research died down. The generation that had witnessed the revolutionary advance continued to work in the hope of discovering something new and better, but when these died out the younger generations who had been trained with chloroform and ether accepted these and their imperfections as established institutions and scarcely thought of the possibility of major advances.

Continual minor improvements in technique were made, but there was extraordinarily little change until about 1923. Since that date new volatile anaesthetics such as ethylene and cyclopropane have been introduced, intravenous anaesthesia with sodium evipan has achieved great popularity, and a wide variety of methods of basal narcosis has been investigated.

With regard to methods of basal narcosis, it is interesting to note that the use of such substances as urethane and paraldehyde for this purpose was established as a routine method in physiological laboratories by the end of the nineteenth century. The long delay in applying these routine laboratory methods to anaesthetic practice is remarkable.

Points on the Progress of Therapeutic Knowledge

This brief summary of the history of anaesthesia reveals some interesting points concerning the progress of therapeutic knowledge. The problem of anaesthesia is the discovery of the optimum technique for producing a certain well-defined effect. This effect is not an end in itself, but is for the purpose of facilitating surgical procedures. The history of the introduction of anaesthetics shows that that advance tended to be an all-or-none process and that the result was largely dependent on good luck. The whole history of anaesthesia might have been different if Wells had chanced upon a good subject and Morton upon a refractory patient for their first demonstrations of nitrous oxide and ether respectively, while in the case of chloroform it is highly probable that its career would have been arrested by a dramatic tragedy if Simpson had not fortunately been forced to postpone his first public trial of the drug.

The speed with which ether and chloroform were adopted is highly creditable to the medical profession. The process was probably assisted by the fact that at that period medical ideas were in a state of flux. The lethal traditions of the "heroic" era were rapidly being discarded; patients with pneumonia were no longer being bled to death, and quinine was replacing calomel in the treatment of malaria.

The history of anaesthesia after 1847 shows clearly one of the major difficulties attending therapeutic advance. The outstanding fact is that thorough familiarity with a technique is equivalent at least to a 30 per cent. difference in efficiency. If a person has mastered a technique it is not worth his while changing to a new and unfamiliar one unless the change promises some big advantage.

It is obvious that after a technique has become fairly effective the likelihood of any major advance is lessened. The history of engineering shows, however, that continuous small advances can add up to constitute a large effect, and there seems no reason why this should not be true in pharmacology.

Need for Further Technical Advance

I think it will be generally agreed that further progress in the technique of anaesthesia is very desirable. The fact that deaths under anaesthesia are increasing rather than decreasing indicates that we are far from having attained perfection. There is a tendency to assume that because the pioneer advances were due to uncoordinated individual enterprise, therefore this remains the best method. I would suggest, however, that although organization is of little service in promoting original thought, yet there comes a stage of development when further progress can only be made by co-ordinated work. This stage has probably been reached in the development of anaesthesia. To decide whether a new anaesthetic constitutes a significant advance is a difficult task, for not only must its usual action be determined, but it is also necessary to know what chance there is of its producing some rare but unpleasant side-action. These facts can only be ascertained by carefully organized large-scale trials of new agents.

The history of anaesthesia, like the history of many other therapeutic problems, shows that this country shines much more in pioneer investigation than in the development of techniques that have already been established. The United States and Great Britain together initiated anaesthesia; I do not propose to attempt to estimate the relative importance of the contributions of

the two countries, but they were of comparable importance, and no other country can claim any substantial share in the credit. The recent advances in anaesthesia are, however, divided between Canada, the United States, and Germany. The change in our country's position is regrettable. I would suggest that what is needed is an organization of the methods of study of anaesthetics that will permit the accurate estimation of the value of new methods, which, even if they do not provide any sensational advance, yet may be a significant improvement on established methods.

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H. C. Ling, L. Greene, and S. E. Pai (*Chin. med. J.*, 1938, **54**, 177) record two fatal cases of diphtheria gravis bacteriaemia. The first, which is only the second example of the condition to be reported in China, occurred in a boy aged 12 who had a severe attack of faucial and nasal diphtheria and died after about ten days' illness. The gravis type of diphtheria bacillus was isolated from the blood. The second case was that of a girl with grave faucial, laryngeal, and bronchial diphtheria, who died after four days' illness. The gravis type of diphtheria bacillus, together with a non-haemolytic streptococcus, was cultivated from the heart blood seven hours after death.

RADIOTHERAPY IN NON-MALIGNANT UTERINE HAEMORRHAGE*

BY

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Diagnosis

The first point to be considered in cases of abnormal uterine haemorrhage is the question of diagnosis. Only too frequently do we see patients who have complained of irregular or excessive bleeding at or about the menopause for which no attempt has been made to discover the cause. Many patients believe that such irregular bleeding is a normal phenomenon and do not seek medical advice; but in some cases they do so, only to be reassured, and to be told to wait for a month or two, when the bleeding will stop, no vaginal examination or other investigation being made. It is from cases such as these that a large proportion of patients with advanced carcinoma of the cervix eventually come for treatment, after a delay of months and when the prospect of cure is very considerably reduced or it is impossible. It cannot be emphasized too strongly that when such symptoms appear the patient must be examined immediately and thoroughly for the possibility that the symptoms may have causes other than menopausal dysfunction of the ovaries, and especially must a thorough pelvic examination be made, to exclude malignant disease.

Apart from this all-important question of diagnosis I do not propose to deal with the vast subject of malignant disease of the uterus, but to consider those types of non-malignant uterine haemorrhage in which radiotherapy is employed. These cases fall into three categories: (1) bleeding at or near the menopause; (2) bleeding associated with fibroids; (3) bleeding in young subjects.

How Radiotherapy Acts

The manner in which radiotherapy acts in the treatment of these cases has been the subject of considerable discussion. It is generally agreed that when external irradiation by *x* rays is the method employed the production of amenorrhoea is due to the destructive effect on the more mature follicles of the ovary. Much experimental research has been carried out on this subject, and Regaud and Lacassagne (1927), describing the effects of radiation on normal tissue, give a clear and concise account of the changes that occur. All ovarian follicles can be destroyed if the dose of radiation is large enough; but there is a very great difference in their radiosensitivity, depending on the stage of maturity. Immature ovarian follicles have little radiosensitivity, and escape apparently unscathed even after heavy irradiation. As they develop, their degree of radiosensitivity increases, until finally the mature follicle is very radiosensitive and is destroyed by only a small amount of radiation. In the ovary of a woman at the end of her reproductive life and approaching the menopause the follicles which remain are either mature or approaching maturity, and therefore are highly radiosensitive. In such cases permanent sterilization can be brought about by moderate doses of radiation. With the young subject, however, this is not the case: some follicles are approaching maturity and are therefore radiosensitive; but the majority have not begun to develop, and need much greater doses for their destruction. A frequent

* Read in opening a discussion in the Section of Radiology at the Annual Meeting of the British Medical Association, Plymouth, 1938.

result of radiotherapy in a young patient is temporary sterilization, with the return of more or less regular and normal menstruation after a period varying from a few months to one or two years.

There is less agreement as to the action of radium placed in the uterine cavity, and two views are commonly expressed: (*a*) that radium acts on the ovaries as in the case of external irradiation by *x* rays; (*b*) that amenorrhoea is produced by a fibrosing action on the endometrium and underlying blood vessels. The usual argument in favour of endometrial action is that, by the physical laws governing the distribution of radiation, the intensity received on the ovaries from radium placed in the uterine cavity can be only a small fraction of that received on the endometrium, and that the dose received by the ovaries would not be sufficient to cause sterilization. Forsdike (1922–3), who strongly supported the theory of endometrial action, has produced evidence of destruction of the endometrium with underlying fibrosis but with demonstrable effect on the ovaries. On the other hand, Corscaden (1935) has demonstrated that in the uterus which had received a sterilizing dose of radium a portion only of the endometrium was obviously affected. Clark and Norris (1927) have observed the destruction of ovarian follicles with regeneration of the endometrium. Actually, assuming that in the average case the ovary is 4 cm. from the endometrium and that, including the thickness of the container, the endometrium is 0.5 cm. from the radium, the dose received from 2,400 mg.-hours filtered by 1.5 mm. platinum with an active length of 4 cm. would be between 10,000 and 20,000 *r* on the endometrium and between 500 and 1,000 *r* on the ovary, depending on their position in each individual case. This is a very heavy dose on the endometrium, and undoubtedly will produce some destruction; but the dose on the ovary, comparing it with the *x*-ray dose given for sterilization, should be sufficient to destroy the follicles.

Again, amenorrhoea produced by intra-uterine radium is almost always accompanied by the menopausal symptoms of hot flushes (86 per cent. in Moore Patterson's (1933) series). A recent article by Corscaden, Kasabach, and Lenz (1938) points out also that examination of blood and urine of women made amenorrhoeic by radium or *x* rays has shown the characteristics found in the spontaneous menopause—absence of oestrone and increase of prolan.

I think the weight of evidence is definitely in favour of action on the ovaries being the main factor in the production of amenorrhoea by radium, but that changes in the endometrium are probably contributory. Abnormal position of the ovaries may account for the small percentage of failures.

I. Irregular Haemorrhage at or about the Menopause

Radiotherapy is undoubtedly the treatment of choice in this condition. In the joint discussions held by the Sections of Radiology and of Obstetrics and Gynaecology at the Royal Society of Medicine in 1933 and in January of 1938 there was general agreement on this question. The advantages of radiotherapy over surgery in this condition are that the same result can be obtained by irradiation with less risk and with a much shorter and almost negligible period of convalescence. The treatment can be carried out either by *x* rays or by the insertion of radium into the uterine cavity. Whatever the method, a preliminary dilatation and curettage is advisable: if radium is inserted the treatment is completed and the patient returns home with scarcely any more delay than from curettage alone, while for the actual *x*-ray treatment she need not even be hospitalized.

Mr. Leonard Phillips (1938) collected from twenty authors over 7,000 cases of menopausal menorrhagia and of fibroids treated by irradiation, with a 95 per cent. cure rate. He estimated that over half of these were cases of menopausal menorrhagia. The mortality rate given by twelve authors was under 1 per cent. for each series and averaged 0.25 per cent. for the whole. The report of the Radiumhemmet in Stockholm (1937) shows 282 cases of this condition, with only one death from intercurrent disease and only two cases which were not cured.

The mortality rate from *x* rays is negligible, while the few deaths recorded from radium have been almost entirely due to an occasional embolus. Moreover, in the very small number of failures of radiotherapy subsequent surgery is not rendered any more difficult. The only contraindications in patients about or over the age of 40 would seem to be the presence of an associated prolapse or cervical laceration, which could be cured at the same time by surgical intervention, or the presence of a previous pelvic inflammation; but even this latter need not be a contraindication if *x* rays are employed and the treatment is given slowly and carefully.

An analysis of sixty-one consecutive cases of menopausal menorrhagia which I have treated at the North Middlesex County Hospital gives the following data:

No. of Cases	Result	Remarks
57	Successful	37 had no further bleeding 13 had one subsequent period 7 had no subsequent periods
1	Partially successful	Periods for 18 months at regular intervals, but very scanty in amount
1	Unsuccessful	Hysterectomy 4 months later for a recurrence of bleeding
2		Subsequent history untraced

COMPLICATIONS AND SEQUELAE

The complications arising from treatment were not serious. The most frequent one was a watery discharge, which was present in twelve cases and persisted from one to four months. The discharge is undoubtedly due to the destruction of a portion of the endometrium by the intense irradiation which it must receive if a sufficient effect is to be obtained on the ovaries. The heavy filtration of 1.5 mm. of platinum and a rubber cover is used to minimize this effect as far as possible. With less filtration one might expect a higher proportion of cases with discharge, and this possibly accounts also for the cases of pyometra which have been described in other series.

Cases of ulceration or cicatricial stenosis of the vagina have been reported after radium treatment, but these have undoubtedly been due either to insufficient packing of the vagina, so that the radium has slipped out of the cervix, or to the use of irritating chemicals in the packing. Corscaden and others have reported cases where a loop of small intestine adherent to the uterus has been damaged by intra-uterine radium and old pelvic inflammation has been lighted up by this treatment, but none of these complications occurred in my own series. In the large number which Phillips collected there were several deaths from embolism, and, as I have said previously, the mortality for the whole series was only 0.25 per cent.

THE CHOICE OF RADIUM OR *X* RAYS

In my own series of cases radium has been used almost exclusively, and the complications have all been due to radium insertion. Such complications have not been

reported after the use of *x* rays alone, and the production of amenorrhoea has been just as certain. The main arguments which have been advanced in favour of radium are: (1) That it is necessary to make a thorough examination under an anaesthetic, with dilatation and curettage in cases of menopausal haemorrhage, and that it is very convenient to insert radium at the time; the whole treatment thus being completed in a few days. (2) That the action of radium may be on the endometrium and may cause less depression of ovarian activity. As I have said, I think the weight of evidence is opposed to this theory.

In favour of *x* rays it may be said that: (1) there are no complications such as discharge due to endometrial destruction; (2) in cases of diabetes, cardiac disease, etc., when a diagnostic curettage must be omitted, no anaesthetic is necessary; (3) there is no danger of embolism or damage to an adherent loop of intestine; (4) even in cases of pelvic inflammation *x* rays can be used if given slowly and carefully; (5) there is no reason why *x* rays should not be employed after a preliminary dilatation and curettage. In addition, radium causes a varying degree of discomfort, nausea, and perhaps vomiting during the time it is in the uterus. This is avoided by the use of *x* rays, although such symptoms may also occur if *x*-ray treatment is carried out too quickly—for example, in a single treatment.

To sum up, I think that when both methods are available *x* rays are to be preferred.

TECHNIQUE AND DOSAGE

Radium.—In England probably the most common method is the one I have described—namely, the use of an intra-uterine applicator containing 50 mg. for forty-eight hours, giving a dose of 2,400 mg.-hours, with a filtration of not less than 1.5 mm. of platinum or its equivalent. Variations of this have been 75 mg. for thirty-six hours or 100 mg. for twenty-four hours, with the object of reducing the time the radium is in the uterus and thereby curtailing the nausea and discomfort. I think, however, that the greater intensity of radiation is more likely to increase the symptoms while the radium is in position. In America the doses have usually been somewhat smaller, but the filtration has been less; 1,800 mg.-hours with 1 mm. platinum filtration is about the maximum. Norman White (1933) showed that recurrence may arise after this dosage, and advised as much as 3,000 mg.-hours with 1.5 mm. platinum, or equivalent, filtration. In our series 2,400 mg.-hours was successful in all but two cases, and these patients were big women, both only 38 years old. In France it is common to use radium packed into the lateral fornices of the vagina as well as the intra-uterine dose, which is considerably decreased. This may be advantageous in that the radium is placed closer to the ovaries and the sequelae of endometrial destruction are diminished; the disadvantage is that vaginal contraction may occur.

X Rays.—Many varieties of technique have been described that aim at the production of amenorrhoea in cases of menorrhagia, and all have met with a high percentage of successes because sterilization in women approaching the menopause can be achieved by a very moderate dose of radiation received on the ovary. This in some cases has resulted in the use of the lower kilovoltages for this purpose, even though the majority of therapeutic *x*-ray machines in this country are capable of working at about 200 kV. A kilovoltage of 150 or even lower will produce amenorrhoea with a fair degree of certainty, but the dose necessary is close to the skin tolerance, and there is more danger of causing skin damage than with an adequately filtered beam generated at 200 kV. Sterilization can be produced in women over 35 by an irradiation carried out in one day, but, as previously stated, this may give rise to a considerable amount of nausea and vomiting, which will be entirely avoided if the dose is fractionized and spread over a week to ten days. The effect is also more certain if the period of irradiation is prolonged. A method which we have found suitable is to use 200 kV with a Thoreus filter and a focal skin distance of 50 cm.; to irradiate three fields, one anterior and two postero-lateral, each about 10 by 15 cm.; and to treat daily, giving a dose of 300 *r* to each field in succession for a total of nine treatments—that is, three treatments of 300 *r* measured on the skin to each area. This results in a dose of 700 to 900 *r* to the ovaries. In very big women it may be necessary to increase the surface dose.

Menopausal symptoms such as hot flushes follow the production of amenorrhoea by either radium or *x* rays, and have been investigated by various workers—Donaldson and Moore Patterson (1938), Malpas (1937), Miss Martindale (1938). There is general agreement that they do not vary either in nature or in severity from those accompanying either the natural or the surgically produced climacteric.

II. Bleeding Associated with Fibroids

In uncomplicated cases of uterine haemorrhage associated with fibroids occurring in women about or over the age of 40 radiotherapy is the treatment of choice. Bleeding is controlled as rapidly and with the same sureness as in menopausal menorrhagia, and the fibroid decreases markedly in size in two to three months. In the case of large fibroids which may not entirely disappear the remnant causes no symptoms. The treatment is carried out in the same way as for menopausal menorrhagia: there are the same indications for the choice of *x* rays or radium, except that, in the case of fibroids, *x* rays seem to be more definitely indicated because the distortion due to the tumour may cause the ovaries to lie at an increased distance from the endometrium, with consequent diminution of the dose received from the intra-uterine radium.

Radiotherapy should not be used in the treatment of fibroids in young women unless there is some factor, such as cardiac disease, which makes the risk of surgery too great. The results are uncertain, and successful treatment invariably produces menopausal symptoms. Other contraindications to radiotherapy for fibroids are: (1) pressure symptoms—for example, interference with micturition through pressure on the urethra when a very rapid result is necessary; (2) evidence of degeneration of the fibroid; (3) very large fibroids. These latter tend to show incomplete regression and are more likely to undergo degeneration. Many radiotherapists do not agree that the size of the fibroid is a contraindication. Finzi (1933) in particular states that some of his most striking results have been in cases with very large tumours, in which operation would have meant considerable risk and prolonged convalescence.

III. Menorrhagia in Young Subjects

This is a field in which the indications for radiotherapy are much more debatable. In the past it has been accepted generally that these patients should be treated by hysterectomy, with preservation of the ovaries, if more conservative treatment has failed. A considerable amount of work has been done, however, the object being to produce a temporary cessation of bleeding by giving a

dose of radiation which would destroy the mature Graafian follicles but would not be sufficient to damage the undeveloped follicles; so that menstruation would become established after a period of amenorrhoea lasting for some months, and there would be a possibility of future pregnancy.

Phillips has tabulated the records of 165 patients, in 128 (77.5 per cent.) of whom normal menstruation was restored. These were mostly adolescents and young women under the age of 25. The treatment was by radium in every instance, and a small dose averaging under 500 mg.-hours was given. It would appear that this treatment is still in the experimental stage, and that the dosage cannot yet be expressed numerically with accuracy. The question as to the liability to subsequent normal pregnancy is even less clearly defined.

Corscaden, Kasabach, and Lenz (1938) record sixty-nine further cases which received a substerilizing dose of radium or *x* rays for menorrhagia, fibroids, or dysmenorrhoea. Eleven pregnancies occurred among six women in this series: five patients aborted: four children lived beyond infancy, and two died at the age of 6 weeks and 6 months. This is only a small series, and the larger numbers of Murphy and Goldstein (1929) and of Miller *et al.* (1936) indicate that preconceptional irradiation should have no harmful effect on subsequent pregnancies, and that certainly it does not cause any increase in the percentage of abnormal children and monsters. It may be thought that the four surviving children in Corscaden's series are sufficient indication that this method of treatment is of value: it is obviously much to be preferred to the alternative of hysterectomy in those cases of severe bleeding which sometimes occur at puberty. It should only be used, however, when all else has been tried, and patients should be warned of the possibility of permanent menopause which may result (with the present state of our knowledge) in a certain proportion, especially of those aged 30 and over.

Further, if one accepts the action of radium as being mainly on the ovary—and it appears that this is the only way that the greater difficulty in sterilizing young women can be explained—it would seem advisable to use *x* rays rather than radium: the dose to the ovaries can be assessed with greater accuracy and there is less damage to the endometrium, with consequently a greater chance that an impregnated ovum can be retained.

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Small-pox has become an extinct disease in Poland, where the law on compulsory vaccination and revaccination is strictly enforced. Complications of vaccination are rare, and no cases of post-vaccinial encephalitis have so far been reported in Poland. In many towns where immunization against diphtheria is also compulsory protection against the two diseases is carried out at the same time.

THE TREATMENT OF NON-MALIGNANT UTERINE HAEMORRHAGE*

BY

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The treatment of non-malignant uterine haemorrhage in women approaching the menopause—the only class of case which I propose to consider—calls for a nicety of judgment which is, I think, ideally to be expected of the gynaecologist with special training in radiotherapy. Those in whom the surgical instinct predominates habitually subject women to major operations which, as I hope to show, can be avoided in many cases by the substitution of radiotherapy. Radical operation entails a primary mortality which is inseparable from hysterectomy; moreover, in every practice there occur, not infrequently, cases which for one reason or another are bad surgical risks—heart and lung disease, obesity, and so forth. On the other hand, the indiscriminate use of radiotherapy will in some cases involve the retention of a dangerously unhealthy uterine cervix, and in other cases, notably submucous fibroids, a liability to sloughing, with the possibility of catastrophe.

It is my practice to use total abdominal hysterectomy in all cases showing an advanced degree of chronic cervicitis, in the presence of large fibroids causing symptoms, unless myomectomy is indicated, and in those judged to be submucous. I avoid sterilizing operations so far as possible by trying medical treatment and sometimes curettage in women who desire to add to their families. In all other cases, including bad surgical risks, I prefer to use radium. Deep *x* rays are not at the moment available for my patients, so in the field of radiotherapy radium for me is Hobson's choice.

My impression has been that radium is most valuable in suitable cases, and for the purposes of this discussion, and with the permission of my colleagues of the Birmingham and Midland Hospital for Women, I have investigated the results of cases treated in that hospital during the years 1935 to 1937. These results I propose to present here.

Analysis of Cases Treated with Radium

Of 226 patients presumed to have been reached by a questionary 199 replied. I have felt justified in assuming that those who failed to reply are a fair sample of the whole; probably any woman with a grievance would have seized this chance of airing it.

Diagnosis.—The cases are classified as follows: subinvolution seven, metropathia haemorrhagica twenty-two, fibroids twenty. Two cases are included in which radium was applied to bring about sterilization. The remaining 148 cases I have not attempted to diagnose scientifically, but have used the term "chronic metritis."

Dosage.—A single 40-mg. or 50-mg. needle was used, with screenage equivalent to 1 mm. of platinum. The needle was left *in situ* for from twenty-four to forty-eight hours, in a few cases for seventy-two hours. The dosage of radium element varied from 960 to 3,600 mg.-hours, the great majority receiving about 2,000.

* Read in the Section of Radiology at the Annual Meeting of the British Medical Association, Plymouth, 1938.

Results

The results I will discuss under headings, including the usual objections to the use of radium therapy—namely, the complaints of discharge and pain following the application.

Bleeding.—A total of 187 cases (94 per cent.) have complete amenorrhoea. Of the twelve cases in which bleeding was not entirely arrested, hysterectomy followed in two cases; two others are still suffering from menorrhagia. The cases in which hysterectomy was performed were those of chronic metritis at ages 33 and 34, the doses being 1,800 and 1,200 mg.-hours, and it seems probable that a larger dose or a further application would have brought about a cure. A case of chronic metritis at the age of 38 (dosage, 1,920 mg.-hours) had no relief at all, and a case of a fairly large fibroid at 48 (1,920 mg.-hours) is in a similar condition. Three women state that they now have normal periods; they are aged 34 (dose 1,800 mg.-hours), 37 (1,200 mg.-hours), and 35 (1,200 mg.-hours). Five state that they have had a period occasionally. Only four patients (2 per cent.), therefore, are dissatisfied on account of abnormal bleeding. As regards the cessation of bleeding after the treatment in the remaining 187, ninety-five had no further loss. In forty-three the bleeding ceased during the first month; it continued longer than a month in fifteen, the longest time being seven months. Thirty had from one to four periods after the operation; two have an occasional period; one had a single slight loss, and one lost for eleven weeks nineteen months after treatment.

Discharge.—This is a most difficult symptom to evaluate, especially as it was present in many cases before the treatment. Eighty-two patients (41 per cent.) replied that they noticed no discharge; thirty-two had a slight discharge, and eighty-one a moderate amount, lasting for varying periods. Two had a profuse discharge—one for a month only; the other, a patient who had no relief from her menorrhagia, still discharges freely. The one significant point I have been able to make on the subject of discharge is that only two patients complain of discharge under the heading "Ill effects of the treatment."

Pain.—It is even more difficult, from the answers to a simple questionary, to reach satisfactory conclusions on this symptom. In 138 cases (69 per cent.) there was no pain at all. Pain was slight or moderate in a further forty-eight. Fourteen cases (7 per cent.) had what they consider severe pain for periods of from a few days up to three months. One woman says she had severe pain for a year. Again, it is significant that only one woman mentioned pain in reply to the question on "Ill effects."

Ill Effects.—No ill effect at all was noticed in 123 (62 per cent.) of the cases. Of the remaining seventy-six, seventeen (8.5 per cent.) mentioned definite menopausal symptoms, such as sweats and flushes—a surprisingly small proportion. Three others noticed an increase in weight, seven had headaches, and fifteen complained of weakness and "nerves." Two complain of dyspareunia (I have not been able to examine these patients), one seems to have had a femoral thrombosis, one cystitis, one severe diarrhoea, and one had thyrotoxicosis later, of which the abnormal haemorrhage was probably an early symptom. The remaining few complaints were irrelevant.

Results from the Patients' Point of View.—In response to the question "Was the result of the treatment entirely satisfactory to you?" 184 (92.5 per cent.) replied "Yes," and twenty-eight patients were moved to add notes expressing extreme satisfaction and gratitude with varying degrees of eloquence. Only fifteen (7.5 per cent.) were less than completely satisfied.

I entered upon this investigation with, I hope, an unbiased mind, and I have been greatly impressed by the almost uniformly satisfactory results. They seem to me striking evidence of the value of radium therapy in selected cases of uterine haemorrhage in women approaching the menopause. I would only add that of 411 cases so treated during the past four years the only death was that of a patient who afterwards proved to be suffering from purpura, a record which I am sure could not have been equalled had radical measures been adopted in all these cases.

DANGER OF PRIMARY ABDOMINAL TUBERCULOSIS IN CHILDREN

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The object of this paper is to present a series of cases of primary abdominal tuberculosis in children which terminated in a fatal meningitis, and to emphasize certain points in order to direct the attention of practitioners to the danger of primary abdominal tuberculosis in the child.

Primary tuberculosis of the lung has been extensively studied in children, and it is well known that in this form of tuberculosis the greatest risk to life results from generalized dissemination of the disease, usually manifested by a terminal meningitis. This risk is particularly great in the first three years of life, so that the prognosis in a case of primary tuberculous infection of the lung depends mainly on the age of the child.

Investigations into the fate of children infected with primary abdominal tuberculosis have been chiefly centred on identification of the type of bacillus responsible, human or bovine, or to the percentage incidence as compared with that of primary pulmonary infection, notably by Griffith (1932, 1934, 1937, 1938) and Blacklock (1932, 1935). Many significant facts have emerged from their investigations, two of the most important for the purposes of this paper being, first, that in 80 to 82 per cent. of cases of primary abdominal tuberculosis the infection is due to the bovine type of bacillus, and, secondly, that generalized dissemination takes place from a primary abdominal focus of infection in a high proportion of cases (32.4 per cent. in Blacklock's (1935) series of 372 cases).

For many years it was denied on the Continent that miliary tuberculosis could follow a primary abdominal infection, and only lately has this contention been refuted by the work of Griffith and Blacklock in this country and of Klercker (1931) in Sweden. The clinical importance of their investigations is even greater than is suggested by the figures quoted above, as these results were necessarily obtained by post-mortem examination, and, as will be seen later, the post-mortem figures do not nearly approximate to the total number of cases of miliary tuberculosis in children.

The Incidence of Primary Abdominal Tuberculosis

A survey of the last 3,214 post-mortem examinations at the Hospital for Sick Children revealed tuberculous meningitis as the cause of death in 284 cases—that is to say, this disease accounted for 8.8 per cent. of the necropsies. In forty-one (14.4 per cent.) of these cases the primary focus of infection was in the abdominal lymph glands. Stated differently, tuberculous meningitis resulting from a primary abdominal focus was responsible for death in more than 1.2 per cent. of over 3,000 necropsies. That this figure in no way represents the true mortality may be gauged from the fact that during the period 1933 to 1937 eighty-five children died in the hospital from tuberculous meningitis, but in only thirty-six of these were necropsies permitted—less than half the total number. (It is noteworthy that in the experience of one of us (G. H. N.) there is exceptional difficulty in obtaining permission to hold a post-mortem examination on children dying from tuberculous meningitis, in many cases because the child has been the only one.)

Criteria of "Primary Abdominal Focus" Infection

Our diagnosis of "primary abdominal infection" was based on enlargement with obvious tuberculous infection of the mesenteric lymph glands, with or without caseation, and complete absence of evidence of tuberculous infection of the bronchial or other mediastinal glands. No case was included in this series in which any enlargement whatsoever of the bronchial glands was recorded, or in which there were any tuberculous lesions of the lungs other than the miliary tubercles seen as a result of generalized dissemination of the disease.

Age and Sex Incidence

The next important feature is the age incidence. Former investigators have already stated that the highest incidence of primary abdominal tuberculosis falls in the first three years of life. The exact figures of this hospital were:

0–1 year	4 cases	3–4 years	4 cases
1–2 years	28 ,,	4–5 ,,	3 ,,
2–3 ,,	2 ,,		

Here the facts only are stated; their significance will be discussed later.

A common and tragic history was that the child had been breast-fed for six to nine months and thereafter had had "ordinary milk diet." In one case, however, recorded in detail as an illustrative case, the parents were emphatic that the child had been given nothing but boiled milk and that there had been no contact with any possible source of human tuberculosis.

Our findings as regards the sex incidence were similar to those of Blacklock and Griffin (1935), who found that tuberculous meningitis following a primary abdominal lesion was commoner in boys than in girls. Twenty-eight of the forty-one cases occurred in boys and only thirteen in girls. Of the total 284 cases of meningitis 152 were in boys and 132 in girls, so that 18.4 per cent. of boys succumbed to meningitis following a primary abdominal lesion and only 9.8 per cent. of girls.

Clinical Features

It may be said that diagnosis of primary abdominal tuberculosis in the living child is almost impossible in the absence of such secondary lesions as tumour-like masses of glands, gross tuberculous peritonitis, or advanced ulceration of the intestine. The first sign of primary abdominal tuberculosis is only too often the onset of meningitis. It was rare in our series to obtain a history of anything but malaise, irritability, with perhaps constipation or vomiting for a short time, very seldom for more than two weeks. Only in four cases was there a history of illness extending over a period of two months. One of these (Case III below) is quoted as an illustrative case. Two of the other three cases with a long history had frank plastic tuberculous peritonitis, the intestines being matted together by caseating glands and adhesions in the mesentery. In the fourth case a long-standing spinal caries affecting the second lumbar vertebra and complicated by a psoas abscess preceded the meningitis.

Unfortunately an *x*-ray examination, which is of such invaluable help, if conducted critically, in diagnosis of a primary lung infection, is of little use for the diagnosis of primary abdominal infection. It reveals only calcified glands, a residuum of the infection, when the disease process is no longer active and danger is past. In the present state of our knowledge we can only say that, as clinical diagnosis of the primary abdominal focus is impossible, prevention of the infection becomes of paramount importance.

Case I

J. C., aged 1 year 8 months, was quite well until two weeks before admission to hospital on June 4, 1937, when he became drowsy and disinclined to play. His appetite became poor. About a week later he had a convulsion and became unconscious. Since then he had been comatose and difficult to rouse. For several days he had vomited after meals. He was a normal full-term infant and was breast-fed (period not stated). There was no history of contact with tuberculosis. There was one other child, a boy aged 6 years, who was well. The parents were healthy.

On examination the child was comatose. The head was retracted. There was marked proptosis of both eyes. The optic fundi were normal. The Mantoux reaction (1 in 1,000) was strongly positive. The cerebrospinal fluid was examined on June 10, and contained 15 lymphocytes per c.mm., 95 mg. of protein per 100 c.cm., and 690 mg. of chlorides per 100 c.cm. No tubercle bacilli were seen. The chlorides fell terminally to 590 mg. per 100 c.cm. The child died a month after admission.

Necropsy Findings.—A typical tuberculous meningitis was present. There was a considerable degree of hydrocephalus. No tuberculomata were found in the brain. Many miliary tubercles were scattered throughout both lungs. There was no tuberculous infiltration of any of the bronchial or mediastinal glands. Miliary tubercles were present in the liver, spleen, and kidneys. A mass of enlarged tuberculous glands was situated in the mesentery. Caseation had not yet begun. No tuberculous ulceration was found in any part of the intestinal tract.

Case II

D. I., aged 1 year 6 months, was admitted to the Hospital for Sick Children on December 9, 1937. For two weeks he had had pyrexia and had lost his appetite. He had vomited occasionally. There was no history of contact with tuberculous patients. The other members of the family were healthy.

When admitted he was drowsy, with a temperature of 102° and a pulse rate of 128. There was neck rigidity, and a positive Kernig's sign was obtained on both sides. No papilloedema and no choroidal tubercles were observed. Examination of the cerebrospinal fluid showed 275 cells per c.mm., 2 per cent. being polymorphs and 98 per cent. lymphocytes; and 100 mg. of protein per 100 c.cm. Reduction of Fehling's solution was poor. Chlorides amounted to 670 mg. per 100 c.cm., and tubercle bacilli were present. The child died six days after admission.

Necropsy Findings.—Well-marked tuberculous meningitis was present. There was a considerable degree of hydrocephalus. A few miliary tubercles were found in both lungs. There was no tuberculous infiltration of any of the bronchial or mediastinal glands. Many miliary tubercles were present in the liver and spleen, but none were observed in the kidneys. There were one large and several smaller tuberculous glands in the mesentery. These had undergone caseation and were becoming liquefied. No definite tuberculous ulceration was found in the small or large intestine.

Case III

J. S., aged 1 year 3 months, was admitted to the Hospital for Sick Children on July 16, 1938. He had been well until two months previously, when he developed intermittent vomiting, lost his appetite, and became constipated. Ten days before admission he had three convulsions. Later he became drowsy and eventually relapsed into coma. There was no history of tuberculous contact. The parents were healthy. The child since early infancy had been fed on "accredited" milk, which the parents declared was always boiled.

The patient, on admission, was comatose and had Cheyne-Stokes respiration. The abdomen was retracted. A mass was felt near the umbilicus and another in the right iliac fossa. Early papilloedema was present, but no choroidal tubercles were seen. The cerebrospinal fluid was not under pressure; it was opalescent and slightly yellow; the chlorides amounted to 650 mg. per 100 c.cm.; and culture was sterile. The child died the day after admission.

Necropsy Findings.—There was only a thin fibrinous exudate containing a few miliary tubercles at the base of the brain and limited to the infundibular space. A few very small miliary tubercles were scattered throughout both lungs. There was no tuberculous infiltration of any of the bronchial or mediastinal glands. The spleen was slightly enlarged, and contained many rather large miliary tubercles. A few miliary tubercles were present in the kidney and liver. There was extensive ulceration of the mucous membrane of the last few inches of the ileum and of the caecum. The ulcers were irregular, and were situated transversely to the long axis of the gut. There were many miliary tubercles on the peritoneal surface. No ulceration was present in the rest of the small intestine or in any part of the large intestine. One large caseous tuberculous gland was situated alongside the second part of the duodenum and a large mass of tuberculous glands was present in the mesentery of the ileo-caecal angle. These glands were in various stages of caseation.

Some Points in Morbid Anatomy

Two of the above cases illustrate the salient feature of the morbid anatomy of tuberculous meningitis resulting from a primary abdominal focus—that is, the small size of the lesion in the abdomen which can give rise to a fatal meningitis. In many cases only *one* enlarged infected gland could be found in the mesentery, and no trace of ulceration could be discovered in the bowel. Reference has already been made to the few cases in which gross peritonitis or ulceration of the bowel was present. Widespread dissemination of miliary tubercles was almost invariable; only in three cases was there a meningitis without miliary tubercles in the viscera. Often only a few tubercles were scattered over the pleural surfaces of the lungs and on the surface of the liver, spleen, and kidneys; but in view of Blacklock and Griffin's series (1935), in which they found 27.8 per cent. of cases with meningitis following a primary abdominal lesion without generalized miliary tuberculosis, it is rather remarkable that only three similar cases (7.3 per cent.) should have occurred in our series.

A macroscopic tuberculoma was found in the brain in only one case, in which a hard mass the size of a cherry stone occupied part of the right crus and the floor of the third ventricle. The rarity of tuberculomata in meningitis following a primary abdominal lesion contrasts with the frequency with which they occur in meningitis resulting from a primary lung infection; for in the whole series of 284 cases of meningitis, tuberculomata were present in thirty-five (12.3 per cent.).

Geographical Distribution

Both Griffith (1938) and Blacklock (1932) have pointed out that primary abdominal tuberculosis, owing to the high percentage of the bovine type of bacillus found in this form, is more prevalent in rural districts than in cities. It is noteworthy that in our admittedly small series of forty-one cases twelve children came from one particular county and from a radius in it of not more than thirty miles. Central London furnished only fifteen cases and "Greater London" another four.

Discussion

Our observations on a series of children who were investigated both clinically and pathologically afford striking evidence of the danger to which children are exposed by infection with primary abdominal tuberculosis. This danger may take the form of generalized miliary tuberculosis with or without a terminal meningitis, or, rarely, of an isolated fatal meningitis. The admirable work and statistical surveys of pathologists and bacteriologists such as Blacklock and Griffith in this country and Klercker in Sweden are apparently not fully appreciated by practitioners. This is the more deplorable because the mortality revealed by their studies and also by our investigations represents only part of the morbidity due to primary abdominal tuberculosis, which results also in many cases of "surgical tuberculosis."

One of the most important points with which we have dealt is the reflection of age incidence on the prognosis. We found that twenty-eight cases of the forty-one came to necropsy during the second year of life, and that no case occurred after the age of 5 years. In order to explain this age incidence many factors must be considered. It is possible that younger children are more susceptible subjects for implantation of the tubercle bacillus in the intestine, as it is well known that their intestines form a locus minoris resistentiae for many intestinal disorders which occur at this age. But a more likely possibility seems to be that in the very young there is *difficulty in localizing* the disease process. This opinion is supported by the parallel series of cases of generalized miliary tuberculosis with meningitis resulting from primary lung infection published by one of us (S. E.) in 1924 and 1930. In these cases failure of localization was revealed by anatomical evidence. In the younger children bronchial glands at a distance from those primarily draining the primary tuberculous focus in the lung were larger and much more often affected than in older children. The slight tendency for younger children to localize the tuberculous process was thus proved by ocular demonstration. It has not yet been possible to bring forward similar evidence in primary abdominal infection owing to the small number of cases personally observed.

Another point to be mentioned is the effect of the difference in feeding which takes place during the second half of the first year. This change from breast milk to cow's milk could be held responsible for the high incidence of fatal cases in the second year of life. We consider that the infection originates in this way in the vast majority of cases, but that the high mortality at an early age is due to the deficient power of localization mentioned above. It is common knowledge that primary abdominal tuber-

culosis is most often due to the bovine type of bacillus which is conveyed in milk. The researches of Blacklock and Griffith leave no doubt on this point, as they found the bovine type of bacillus in 80 to 82 per cent. of cases with primary foci in the abdomen. We are therefore entitled to assume that in our cases also the bovine type of bacillus predominated. This assumption is sustained by the fact that a majority of the children came from rural areas where children are more often fed on raw milk.

It may be remarked that in Case III the parents declared that the child had been given only boiled milk. The possibilities in this case are, first, that the infection was of the human type, which is rare; and, secondly, that the milk had been insufficiently or not always boiled. To omit to boil milk properly on a single occasion is quite sufficient to allow the tubercle bacillus to enter the body and give rise to infection.

Conclusions

Primary abdominal tuberculosis is a commoner disease in children than is generally supposed, and the true incidence is much higher than post-mortem figures indicate.

In primary abdominal infection, as in cases with a primary lung infection, the prognosis depends on the age of the child: the younger the child at the time of infection the worse the prognosis.

We are unable to accept the current view that primary abdominal tuberculosis can be more lightly regarded in children than can a primary lung infection: the bad prognosis in young children refutes this view. Diagnosis in cases of primary abdominal tuberculosis in the living child is extremely difficult; consequently early treatment is rarely possible. Prevention of infection is therefore all-important. Many cases of tuberculous meningitis, miliary tuberculosis, and crippling deformities could be prevented. We should endeavour, as an ideal, to secure for children milk from tuberculin-tested herds only, but at present it is impossible to provide this for the whole population. Therefore the greatest measure of protection is afforded by milk which has been boiled or efficiently pasteurized.

We wish to thank Dr. D. N. Nabarro, Director of the Pathological Department, Hospital for Sick Children, for the interest he has taken in our work, and the honorary medical and surgical staff of the hospital for permission to use their case reports and post-mortem records.

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The regulations governing the award of Commonwealth Fund Fellowships have been amended since the publication in the *Journal* of October 15 (p. 804) of the announcement regarding the fellowships. The chief alterations are as follows: Candidates must be unmarried and must not have attained the age of 30 on September 1 of the year of award; fellowships are vacated by marriage; they are open to men only; and are tenable for two years. Readers of the *British Medical Journal* who are interested are advised to apply to the secretary of the Commonwealth Fund Fellowships, 35, Portman Square, W.1, for copies of the revised regulations.

APLASTIC ANAEMIA WITH COMPLETE RECOVERY

BY

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When treating a patient with aplastic anaemia it is difficult to decide as to how long it is worth while keeping him alive by repeated blood transfusions in the hope that his bone marrow will ultimately revive and so maintain his cure. There are types of so-called idiopathic aplastic anaemia in which the bone marrow fails to recover and the disease is progressive and fatal. Blood transfusion probably does no more than postpone their death by a few months. There are other types of aplastic anaemia, usually the result of poisoning by drugs, in which the bone marrow quickly recovers its function and effects an automatic cure with or without the aid of a few blood transfusions. It is between these extremes that we are faced with the difficulty of deciding the number of transfusions to be given.

The case whose story is reported here is that of a man with aplastic anaemia following salvarsan therapy who in 1935 was kept alive for nine months with blood transfusions and is now (three years afterwards) in good health. At first no history of treatment by salvarsan was obtained, and in the absence of any apparent exposure to a noxious drug he was regarded as suffering from idiopathic aplastic anaemia. With the haemoglobin falling to 18 per cent. and the patient almost blind from retinal haemorrhages, there appeared to be no hope of recovery. He continued in this state for five weeks while transfusions were given to him two or three times weekly. In all, twenty-five transfusions were given in nine months.

Case History

The patient, a confectionery baker aged 50, began to complain of lack of energy and shortness of breath on exertion, and in April, 1935, his friends noticed that he was getting pale. A blood count done at that time showed 50 per cent. haemoglobin with colour index 1.1, and in spite of intensive oral and intramuscular liver therapy his condition rapidly became worse. He was first seen in May, and was admitted to hospital on the 30th of that month. He was then in a very critical condition, with dyspnoea on the slightest exertion. His mental processes were distinctly sluggish, his manner morose, and the history was given in a distant and hesitant manner which did not lead one to place much reliance on his statements. There were widespread haemorrhages into the skin and mucous membranes, and these were so thickly scattered in the retina that he was scarcely able to see. There were a few superficial ulcers with their sloughs on the buccal surface of the lower lip. Apart from some distension of the bladder, which could be palpated without discomfort, and absent ankle-jerks, examination was negative. The Wassermann reaction was very weak positive, and the van den Bergh normal, and radiographs of the femora revealed no encroachment on the medulla.

A blood examination resulted as follows: red cells, 1,380,000; haemoglobin, 23 per cent.; colour index, 1.02; reticulocytes, 0.6 per cent. The red cells were normal in shape, size, and colour. There was a slight amount of anisocytosis, but no poikilocytosis or polychromatophilia. No early forms were seen. Platelets numbered 38,600 (over 500 erythrocytes), and the white cells 2,187. The differential count showed: polymorphs, 16 per cent. (350 per c.mm.); lymphocytes, 72 per cent. (1,575); monocytes, 9 per cent. (197); eosinophils, 1 per cent. (22); basophils, 1 per cent. (22); myelocytes, 1 per cent. (22). The lymphocytes were mainly large in character. No primitive forms were seen. The

Arneth count over 16 polymorphs showed a slight shift to the left: young forms, 5; 2 lobes, 9; 3 lobes, 2.

The patient's doctor was unaware that the man had ever had any serious illness or any treatment during the few years he had known him, and the patient was unable to give any reliable evidence regarding himself. It subsequently transpired that in 1926, when living elsewhere, he sought medical attention for incontinence of urine, and was found to have a positive blood Wassermann reaction. He received treatment during the subsequent four and a half years, at the end of which time he was discharged symptom-free but with the Wassermann reaction still positive. Details of treatment before July, 1928, are not available, but subsequent to that date he received three doses of 0.45 gramme of N.A.B., four of 0.6 gramme of N.A.B., six of 0.6 gramme of stabilarsan, and thirty-eight of 1 grain of mercury.

In July, 1928, symptoms returned, and treatment was resumed, being continued until December, 1934. During this time he received four doses of 0.45 gramme and five of 0.6 gramme of N.A.B. Jaundice then developed, and no treatment was given until March, 1935, from which date to the onset of symptoms six doses of 0.45 gramme of N.A.B. were administered, with no apparent ill effects other than slight loss of weight.

On account of the patient's condition on admission and a further fall of haemoglobin to 18 per cent. and red cells to 750,000 in the next week in spite of 18 oz. of blood being received as three transfusions, a hopeless prognosis was given. Intramuscular injections of pentose nucleotide were without effect on the white cell count and were soon discontinued, as the patient complained bitterly of pain at the site of injection. It was decided to see if recovery of the bone marrow would occur with the blood at a higher level, and accordingly ten transfusions of up to one pint were given in the next four weeks. During this period a remarkable change took place in the patient's mental and physical condition. He became cheerful and jocular, was able to get up and go about in comfort, and vision was restored to normal. No haemorrhages were now visible in the retina, and the blood count was as follows: red cells, 4,320,000; haemoglobin, 68 per cent.; reticulocytes, 0.6 per cent.; white cells, 4,375; polymorphs, 12 per cent.; lymphocytes, 84 per cent.; monocytes, 4 per cent.

At no time during this period did the reticulocytes exceed 1 per cent. The patient was discharged with instructions to take things very quietly and avoid physical exertion. One month later the haemoglobin fell to 38 per cent., but he still felt fairly well, and was able to carry out light supervisory work. Regular transfusions of one pint at intervals of three weeks were begun, and by this means haemoglobin was kept in the region of 50 per cent. He was transfused as an out-patient, and no untoward reactions were experienced, except on one occasion when loss of consciousness and an epileptiform convulsion occurred towards the end of a transfusion. The patient was then admitted for a few days, and an itching urticarial rash appeared three days after the transfusion. The blood was from a donor who had been used three months previously, and had been given at the same rate and in the same manner as on other occasions—citrated blood through a No. 12 hypodermic needle with a two-way syringe. The blood of two polycythaemic patients with haemoglobin 130 to 140 per cent. was used on several occasions, but had to be diluted with saline to facilitate passage through a No. 12 needle.

Throughout this period the red blood cells showed a good deal of anisocytosis and the colour index remained high. At no time did the reticulocytes exceed 1 per cent. Platelets were about 40,000; the white blood cells were 1,500 to 4,000, with polymorphs less than 20 per cent. and many of them bilobed.

In March, 1936, owing to thrombosis of his only good vein and increasing difficulty in using the small superficial ones, it was decided to see if he could maintain himself at a low level. At first a slight fall occurred, but after several weeks the haemoglobin began to rise at the rate of 2 to 3 per cent. a week. Reticulocytes varied from 2 to 6.3 per cent.

In April, 1937, the count was: red cells, 4,110,000; haemoglobin, 99 per cent.; colour index, 1.2; white cells, 7,700. In August, 1937, it was: red cells, 4,880,000; haemoglobin, 105 per cent.; colour index, 1.07; white cells, 6,000; platelets, 214,000; polymorphs, 25 per cent.; lymphocytes, 52 per cent.; monocytes, 2 per cent.; basophils, 1 per cent. Undifferentiated, 18 per cent.; myelocytes, 2 per cent.; the red blood cells showed moderate anisocytosis.

When last seen, on December 28, 1937, the patient appeared quite normal, had had no further nervous symptoms, and the blood count was as follows: red cells, 4,600,000; haemoglobin, 92 per cent.; reticulocytes, 0.4 per cent.; white cells, 6,800; platelets, 370,000. At the present date he is known to be still well and at work.

Commentary

A case showing marked diminution in all the cellular elements of the blood following considerable arsphenamine therapy is recorded. Fortunately the anaemia due to aplasia in this case was not increased by haemorrhage from the mucous membranes, as seen in a recent case of aplastic anaemia due to gold therapy for rheumatoid arthritis in which a fatal haematemesis occurred.

Despite a fall to 18 per cent. haemoglobin and 750,000 red cells recovery has occurred, and the patient is apparently normal more than two years after the last transfusion.

In the cases reviewed by McCarthy and Wilson (1932) that with the lowest level—one million—recovered, as did Imrie's (1935) case with 840,000 red cells and 17 per cent. haemoglobin. The former authors concluded that the drug and dose used made little difference to the prognosis, but the shorter the period between the last dose and the onset of symptoms the better the outlook. The thirty-four cases they described and collected from the literature showed a mortality of 83 per cent.

During the period that the blood level was kept up by transfusions there was no evidence of spontaneous recovery, the haemoglobin always being about 40 per cent. immediately before and 50 per cent. immediately after a transfusion.

Within a few weeks of ceasing transfusions there was an increase of reticulocytes and a gradual rise of red cells. The colour index remained high until a normal level was reached, and granulocytes lagged behind in their recovery.

There seems no doubt that without repeated transfusions the case reported would have rapidly proved fatal.

In all 418 oz. of blood were given as twenty-five transfusions.

I am indebted to Dr. J. C. Spence for allowing me to treat this case and for many helpful suggestions.

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All applications for fellowships in connexion with the Finney-Howell Research Foundation must be filed in the office of that Foundation, 1211, Cathedral Street, Baltimore, Maryland, U.S.A., by January 1, 1939; the awards will be announced on March 1. This Foundation was created to intensify research into the cause or causes of cancer and its treatment. Ten such fellowships were awarded in 1938; each carries an annual stipend of 2,000 dollars, and may be renewed in two successive years. Applications are to be made on the forms supplied by the secretary of the Foundation at the above address.

TRIPHENYL ETHYLENE TESTED ON CAPONS

BY

A. M. HAIN, D.Sc.

(From the Institute of Animal Genetics, Edinburgh University)

It has been shown by Robson and Schönberg (1937) that the synthetic substance triphenyl ethylene is highly oestrogenic when tested on ovariectomized mice; its ability to inhibit the specific effects of progesterone on the endometrium and muscle of the rabbit's uterus (Robson, 1938) demonstrates that it possesses many of the attributes of oestrin. Since oestrin also has a typical gynaecogenic action in that it causes hen-feathering in the capon (Juhn and Gustavson, 1930), it was suggested to me by Dr. J. M. Robson that the ability of triphenyl ethylene to induce a similar effect might be examined. Tests made on old English game capons (bantams) of the black-red variety produced no change in feather-colouring when 1 gramme of substance was injected in two days. It was found, however, that neither do such birds react to 1 mg. of oestrone of the international standard, and in the experience of Dr. Parkes (personal communication) they are comparatively insensitive to oestrin.

When a brown Leghorn capon was injected with a total of 0.8 gramme of triphenyl ethylene in two days a very marked reaction was obtained in both the colouring and the structure of the feathers. Thus, triphenyl ethylene possesses in common with another synthetic compound—diethylstilboestrol (Dodds, Lawson, and Noble, 1938)—oestrogenic and gynaecogenic activity.

The combs of capons injected with 0.8 and 1 gramme of triphenyl ethylene showed no increase in size but actually a slight regression on their previous minimum. A similar absence of effect was observed when 1 gramme in arachis oil was smeared on the comb of another capon. When the equivalent of approximately 0.5 gramme was smeared on the comb of a capon which was at the same time being injected with 1.5 mg. of standardized androsterone there was no inhibition of the response to androsterone.

Summary

1. Triphenyl ethylene causes hen-feathering in the brown Leghorn capon, as does oestrin and diethylstilboestrol.

2. In the amounts used it had no effect on old English game bantams (black-red), which have a low sensitivity to oestrin.

The expenses of the above investigation were defrayed by grants from the Medical Research Council.

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During the past twenty-four years Dr. T. Wilson Parry has devoted much of his spare time to the study of primitive surgical holing (trephining or trepanning) of the human skull, and has published in all seventeen papers on this branch of medical history. He has now presented to the Library of the British Medical Association reprints of these contributions in pamphlet form, which can be consulted there by members interested in the subject.

Clinical Memoranda

Sulphanilamide in Climatic Bubo

Poradenitis venerea (climatic bubo or lymphogranuloma inguinale) is an uncommon disease in Great Britain, and the majority of the cases met with here are seen by the venereal diseases officers in the larger seaports. In the past the treatment of this condition with antimony compounds has been disappointing, and in the only case I have seen treated with vaccine the result was unsuccessful. The cases which reported for diagnosis before the infected glands had broken down have responded satisfactorily to surgical excision, but unfortunately the disease is usually further advanced when first seen and is characterized by extensive adenitis, inflammation of the adjacent tissues, sinus formation, and even involvement of the thigh and abdominal wall. The treatment of such cases has, in my experience, been disheartening to patient and doctor alike, and has required several dressings daily over a period of some months before healing of the sinus has been effected. It may be of interest, therefore, to record the following case, which satisfies the criteria necessary for a diagnosis of climatic bubo, and in which the response to chemotherapy with sulphanilamide has been very encouraging. In this connexion it is of interest to note that Fritz Bär (1938) has studied the experimental action of prontosil album in lymphogranulomatous meningo-encephalitis in mice, and mentions that Gjuric (1938) has recently reported successful results in the treatment of poradenitis venerea with prontosil album and also with a combination of prontosil album and fouadin. Kubitzki (1938) recorded a prompt fall of temperature and local improvement in cases treated with injections of prontosil.

CASE REPORT

The patient, a seaman aged 28, developed a small painless and non-tender swelling in the left groin three days after exposure to infection. A fortnight later the swelling had increased considerably and was then tender and painful. At no time was a genital sore noted. He attended the Seamen's Dispensary, Liverpool, where a diagnosis of climatic bubo was made and admission to hospital advised for excision of the infected glands, but unfortunately the patient refused to accept this advice. The Wassermann reaction at this visit was negative.

Six weeks after the onset of the adenitis the patient came under my observation when he was admitted to the V.D. wards, Mill Road Infirmary, Liverpool. On admission he felt and looked ill, and presented extensive inflammation and matting of the left inguinal glands. The inflammation also affected the tissues adjacent to the infected glands, involving an area which overlapped the left inguinal canal and extended below Poupart's ligament well into the base of Scarpa's triangle. The bubo had already broken down, and a copious, seropurulent, odourless discharge was draining through two small sinuses. There was no evidence of a genital sore or scar, and a tentative diagnosis of poradenitis venerea was subsequently confirmed by a positive Frei test. The Wassermann reaction was again negative, and an intradermal test with dmelcos vaccine produced no reaction.

Encouraged by the beneficial results of sulphanilamide therapy which I have obtained in cases of chancroidal ulceration, I decided to use this drug in the present case. The patient received 5 grammes daily for two days, 3.5 grammes on the third, fourth, and fifth days, and 2.5 grammes on each of the following eight days. Glycerin and magnesium sulphate dressings were applied locally, and four days later the bridge of necrotic tissue between the two sinuses was excised to facilitate drainage and permit packing the wound with gauze soaked in cod-liver oil. Under this regime the discharge

rapidly diminished and the wound showed evidence of healing. The patient was sent home in good health thirty-two days after admission, the sinus in the left groin being completely healed.

I wish to acknowledge my indebtedness to Dr. A. O. Ross for the findings obtained at the Seamen's Dispensary, Liverpool; and to Dr. L. Findlay, medical superintendent, Mill Road Infirmary, Liverpool, for permission to publish the case report.

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Extra-uterine Intra-abdominal Pregnancy

Recent articles prompt us to record a case of extra-uterine intra-abdominal pregnancy in a native from the district of Mwanza, in the Lake Province, Tanganyika Territory.

CASE REPORT

The patient was admitted to the Mwanza Hospital on June 10, 1938, with a history of a nine-months pregnancy and, five days before admission, small pains and the loss of a little blood. The pains lasted for one day only. Previous labours (three) had been normal, but each infant had died after a few days.

At midday on the day of admission the patient was examined by the senior sister, and again at 4 p.m. by one of us. The notes read: "Vertex presentation, membranes ruptured; soft mass behind head (? twins), cervix two fingers dilated." The case was puzzling, so at 4.30 p.m. another examination was made, and the following was recorded: "Vertex presentation, membranes ruptured, cervix peculiar to touch, and a little bleeding after examination. The abdomen tense." Further examinations showed:

6 p.m.: Very slight pains; still losing liquor and very little blood.
9.15 p.m.: Very slight pains.
June 11, 2.20 a.m.: Slight pains; very slight loss of liquor. Has slept. Pulse 106.
7.15 a.m.: Losing a little blood; slight pains. Pulse 92.
10.15 a.m.: Refused intervention. No pain; liquor stopped. Pulse not good.
11.50 a.m.: No progress since yesterday; ? foetal heart heard. Slight blood loss. Blood malaria-positive.
2.30 p.m.: Consented to go to theatre. Condition very poor; but we were convinced that a laparotomy was needed, although a positive diagnosis had not been made.

Operation revealed an intra-abdominal pregnancy. The head had sloughed through the vaginal vault and presented as a vertex. The uterus, enlarged to the size of a five-months pregnancy, lay behind the head. The placenta was plastered on to the intestines. Peritonitis was advanced.

The child was a full-term female of good development, and weighed 7½ lb. The mother collapsed, and all efforts to resuscitate her and the infant failed.

COMMENTARY

The interest in this case lies in the vertex presentation of an intra-abdominal pregnancy. The head had found the pelvis, and intra-abdominal pressure had caused a necrosis. On removal of the foetus from the pelvis the large opening into the vagina could be easily seen and demonstrated.

There was no story of injury or interference by friend or witchcraft practitioner, but the doubt cannot be stilled that someone in the village community had attempted to deal with the condition.

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Reviews

TROPICAL DISEASES AND HYGIENE

Krankheiten und Hygiene der warmen Länder. By Professor Dr. P. Mühlens, Professor Dr. E. Nauck, Dr. H. Vogel, and Professor Dr. H. Ruge. Fourth edition. (Pp. 564; 431 figures, 6 coloured plates and 1 in half-tone. RM. 43; bound, RM. 45.) Leipzig: Georg Thieme. 1938.

Ruge, Mühlens, and Verth's well-known work *Tropical Diseases and Hygiene* now appears in a fourth edition revised and enlarged to 560 pages, with important contributions by Professors Nauck, Vogel, and Martini. It is a complete systematic treatise covering the whole field of tropical medicine and hygiene, and forms an important source of reference to the latest advances in these subjects. Professor Ruge is the author of sections dealing with climate and tropical hygiene, the bacterial diseases, tropical skin and venereal diseases, blood technique, sleeping sickness, Chaga's disease, tropical surgery, the tropical anaemias, and other matters. Professor Mühlens provides the sections on malaria (eighty-five pages), the leishmaniases, amoebic diseases, and the spirochaetoses. The sections on yellow fever, dengue, sandfly fever, typhus, *Bartonella*, psittacosis, and deficiency diseases are by Professor Nauck; while Dr. Vogel is responsible for the section on parasitic worms (sixty pages) and Professor Martini for those on myiasis, sandflies, and poisonous animals. This indication of subject-matter suffices to show how large is the field now covered by tropical medicine; a detailed account of the enormous quantity of material included in the volume is impossible in the space of a short review. The section on tropical hygiene gives an interesting summary of the different climates of the earth, discusses acclimatization, clothing, construction of dwellings, dietary, water supply, hints on mode of life, care of children, and the general question of health and protection from disease in the Tropics. The section on malaria covers in condensed form practically the whole of this immense subject, and is a difficult one to comment on beyond saying that it is up to date and includes recent advances in treatment and in the principles of modern anti-malarial sanitation. The section on sleeping sickness provides a good clinical account of the different stages of the disease and its treatment, with brief but informed references to *Glossina*, the stages of the parasite as seen in the insect host, and methods used in control. Good short sections on kala-azar, Oriental sore, and American leishmaniasis are followed by a larger one on amoebic dysentery and other amoebic conditions, and this in turn by consideration of the now numerous spirochaetal diseases. In place of the one-time single heading of "relapsing fever" of the older textbooks, one now finds separately described the European (*Spirochaeta obermeieri*), the Spanish (*S. hispanica*), the Central African (*S. duttoni*), the North African (*S. berbera*), the Asiatic (*S. carteri*), the North American (*S. novyi*), and the South American (*S. neotropicalis*) forms, differing in the nature of the causal agent, the clinical features, and the vector concerned in transmission. Among diseases of leptospiral origin are useful sections on Weil's disease, Japanese seven-day fever, and rat-bite fever. Under rickettsial diseases are again many conditions, once unheard of or vaguely described, now clearly set forth with illustrative matter; and the same with diseases due to the bartonellas. Among the deficiency diseases is a section on epidemic

dropsy. Besides such major bacterial infections as plague, cholera and bacterial dysentery, and leprosy, there are accounts of tularaemia, psittacosis, and melioidosis. An interesting and well-illustrated section is that on poisonous animals.

The volume is one which as a work of reference on tropical diseases can scarcely be excelled. Accompanying the text are a number of well-executed coloured plates representing appearances of the different malaria parasites, forms of leucocytes, ova of worms, and other subjects.

SOCIAL HYGIENE

Empire Social Hygiene Yearbook, 1938-9. Prepared by the British Social Hygiene Council. Fifth annual edition. (Pp. 603. 15s. net.) London: George Allen and Unwin. 1938.

The *Empire Social Hygiene Yearbook,* which is now in its fifth year, contains a vast amount of information, not easily to be gathered from other sources, concerning the health, social, and educational services of the counties and county boroughs of Great Britain and Northern Ireland. Similar information is also afforded regarding the various States and provinces of India, the Dominions, and the Colonies. The preoccupation of the book is with the facilities for combating venereal diseases, but it is not limited to that subject, and the information which it gives with regard to district nursing, health visiting, ante-natal and child welfare centres, and provision for mental defectives is useful and well arranged. There are chapters, compact with information, on housing, maternity, illegitimacy, juvenile delinquency and probation, mental defect, tuberculosis, blindness, deafness, and crippledom. The section on the care of cripples is a relatively new feature. The number of cripples in England and Wales is stated to be nearly 200,000; at least eight of every thousand children under the age of 5 are cripples or require orthopaedic treatment, and of the population as a whole at least four in every thousand are in the same category. The analysis by counties and county boroughs includes this year a new section giving information about orthopaedic clinics. In some areas, particularly certain of the Welsh counties and Lancashire, these clinics are numerous and well attended; in others they are scarcely functioning, and from fifty-eight areas no information at all is vouchsafed. Local statistics of registered blind persons are also given, but here again many areas, including populous ones, furnish no returns. An article on the marriage laws sets out the changes made by the Matrimonial Causes Act. This yearbook has well earned its place on the official desk and in the hands of those engaged in health and social services.

THE NEW CHEMOTHERAPY

Sulfanilamide Therapy of Bacterial Infections. With Special Reference to Diseases caused by Hemolytic Streptococci, Pneumococci, Meningococci, and Gonococci. By Ralph R. Mellon, M.D., Paul Gross, M.D., and Frank B. Cooper, M.S. (Pp. 398; 16 figures, 26 tables. 18s.) London: Baillière, Tindall and Cox. 1938.

The three years which have now elapsed since the public advent of prontosil have provided more than enough material for a book, and the volume *Sulfanilamide Therapy of Bacterial Infections,* by R. R. Mellon, P. Gross, and F. B. Cooper, has now been written. Actually less than half the text is a review of the chemistry, pharmacology, and experimental and clinical effects of sulphonamide compounds. The remainder is an account of the authors' own work on this subject, of which the main parts have been studies of the chemotherapy of experimental streptococcal and pneumococcal infection and an analysis of the mechanism of sulphanilamide bacteriostasis. They explain the divergent results of *in vitro* tests in this connexion on the basis of "potentiation," by which is meant the combined damaging effect of sulphanilamide and something else. In their own experiments this other factor was saline used for culture dilution, which appeared to render streptococci more vulnerable than they were when broth was the diluent. There may be something in this idea, although its translation to *in vivo* terms is not an easy matter, and it would still hold good in principle even were the initial damaging agent not sodium chloride but copper: it is necessary to point this out because the source of the distilled water used in preparing the saline is not stated. Some of the arguments elaborated in this part of the book do not carry conviction; at least one is based on premisses which have since been proved false, but it must be difficult to escape such penalties in writing at large on a subject undergoing such rapid development.

Freedom from the space restrictions which encompass the writer of a mere paper has evidently tempted the authors to dilate not only on their personal beliefs about chemotherapy but on other subjects remotely related, and there are descriptions of alleged bacterial mutation and a discussion of "fitness" in rabbits and men as indicated by capacity for heat regeneration, the connexion of which with the main subject seems rather forced. It is chiefly for its review of the experimental and clinical development of sulphanilamide therapy that this book will be valued: that review is clear, full, and competent. The clinician anxious to base his use of this drug on a better understanding of its properties, and the experimentalist who might otherwise have to search for a single fact among a score of papers in almost as many different journals, can each profit by reference to it.

COLLAPSE THERAPY OF PHTHISIS

Kollapstherapie der Lungentuberkulose. By Hein, Kremer, and Schmidt. Two volumes. (Pp. 1,135; illustrated. RM. 116; bound, RM. 119.) Leipzig: Georg Thieme. 1938.

The complaint is often heard that in spite of the advances made in the collapse therapy of pulmonary tuberculosis much of it still lacks a precise physio-pathological basis. The book by Hein, Kremer, and Schmidt (with three collaborators) should convince those who have not yet been won over to collapse therapy that in some clinics at all events such an accusation is not justified. What is by many still considered as belonging to theoretical or experimental fields is here seen applied in daily routine; for instance, tomography, kymography, and detailed investigation of the respiratory and cardiac functions. This is a far cry from the almost care-free embarking on a collapse operation after little more than inspection of a skiagram. But it required six authors, 1,100 pages, and over 1,000 illustrations to present a readable and logical account of methods and review the more important literature. Nevertheless it will be the costliness of these two volumes rather than their size which will discourage readers amenable to the conviction that phthisis is a curable disease from appreciating their contents.

A chapter on the morbid anatomical basis of collapse therapy by Wurm is followed by chapters on the morbid anatomical and clinico-radiological aspects of the healing of cavities by Wurm and Alexander respectively. In a section of nearly 200 pages, containing 200 illustrations, Schmidt and Gaubatz discuss the basis and methods of determining the indications for collapse therapy. The chapters on artificial pneumothorax and on oleothorax

are written by Schmidt, while Krèmer deals with adhesion-section. In the second volume he discusses phrenic interruption, and is followed by Schmidt on "pneumolysis with subsequent extrapleural pneumo- or oleo-thorax." This is the best account so far published of this much-discussed operation, but it is debatable whether one should include in a standard textbook so full an account of a method the remote results of which are as yet unassessable.

Schmidt rightly insists that the procedure is not new, but has merely been taken up again recently with success. He brings out the indications clearly. The operation is indicated in the late stages of the "early" cavity (when intrapleural pneumothorax is impracticable owing to adhesions), and in certain patients with "tertiary" cavitation (for which up to the present plombage or thoracoplasty was carried out) when these operations are contra-indicated; extrapleural pneumothorax is associated with a slight operative mortality (2 per cent.), and affects the functional capacity of the lung only to an insignificant extent. These facts also support its use for bilateral collapse. Thus Schmidt's view on indications differs entirely (and in the reviewer's opinion rightly) from the view sometimes expressed—that extrapleural pneumothorax should always be carried out when possible in preference to thoracoplasty.

Kremer discusses plombage and shows that it retains a definite place in the treatment of cavities when thoracoplasty is contraindicated. Thoracoplasty is amply described by Hein in a section of 350 pages with 308 illustrations. The help that can be obtained from the use of tomography in connexion with this operation is well demonstrated. Several detailed tables of personal results are appended. In the final chapter Schmidt does a service in emphasizing the great importance of *Korrekturplastik* by devoting a special section to it himself; for too many surgeons, by not keeping rigidly in mind that the aim of collapse therapy is to render the patient sputum-negative, are apt to show timidity in tackling the sputum-positive patient on whom they have already performed a thoracoplasty.

The production of the book maintains the high standard of German medical publications, but the price will put the work out of reach of those who have not constant access to a good medical library. The illustrations, some of which are in colour, are excellent. The reproductions of the skiagrams leave nothing to the imagination. The typographical arrangement of the ample bibliographies, the usual one in German publications, must, however, be criticized; it will not encourage the reader to verify chapter and verse.

OTO-RHINO-LARYNGOLOGY

Diseases of the Nose, Throat and Ear: Medical and Surgical. By William Lincoln Ballenger, M.D., F.A.C.S., and Howard Charles Ballenger, M.D., F.A.C.S. Seventh edition, thoroughly revised. (Pp. 1,030; 576 figures, 30 plates, mostly in colour. 50s. net.) London: Henry Kimpton. 1938.

Practical Otology, Rhinology and Laryngology. By Adam Edward Schlanser, M.D. (Pp. 315; 81 figures. 21s. net.) London: Henry Kimpton. 1938.

Ballenger's *Diseases of the Nose, Throat and Ear* has become a standard American textbook, and the seventh edition is now published. The general style remains the same, but there has again been some rearrangement, and some new sections, such as those on physical therapy and on petrositis, have been added. The chapters on endoscopy at the end of the book by Dr. G. Tucker and Dr. C. L. Jackson again form a valuable feature. It was suggested in a former review that the practice of introducing sections by independent authors might be extended with advantage. Dr. J. M. West describes the management of dacryostenosis, but otherwise this plan has not been followed to any extent, so that the opportunity of thorough revision of such chapters as those on malignant disease has been missed. The general excellence of the book, especially of the section on the ear, will no doubt maintain its popularity, but this edition provides no striking novelty, and some parts which are now out of date might have been eliminated.

Practical Otology, Rhinology and Laryngology is a manual written by Colonel Schlanser of the Medical Corps, United States Army, quite suitable for general use but directed chiefly to the attention of military surgeons. As army medical officers are expected to be competent in a variety of branches of medical practice, among which otology and laryngology have now increased in importance, this book should be popular in all English-speaking countries, as it presents the subjects from the rather different point of view of military practice. There is an account of all the ordinary examinations, treatments, and operations likely to be encountered in practice amongst soldiers and their families, but a few points demand criticism. The arrangement of the book upon a symptomatic rather than a pathological basis will fail to satisfy many readers. The author states that a chronic discharge from the ear is indicative of neglect or faulty treatment of an acute inflammation of the middle ear. This opinion no longer holds good for many cases in which otorrhoea is associated with cholesteatoma. There are also many instances of loose writing, though the meaning is usually clear. The following is an example: "The indications for surgery in chronic suppuration of the ear are less clearly defined and more difficult to interpret than acute otitis media and mastoiditis." A more serious criticism relates to the use, advocated by the author, of pyramidon as a substitute for aspirin. Atophan in the form of arcanol is also recommended without warning against the danger of using this drug. On the whole the advice given in the management and treatment of patients is sound, and the author shows wisdom and caution in many points likely to arise, and his book can be recommended as a useful guide both in civil and in military practice.

Notes on Books

A total of 188 cases occurring in Sweden, Norway, and Denmark form the basis of A. GREVILLIUS'S monograph on malignant tumours of the testis, *Über Maligne Hodengeschwülste*, published by Appelbergs of Uppsala. Among important points which emerge from their analysis are the diagnostic and prognostic value of detecting sex hormones in the urine, the prognosis and degree of radiosensitivity of different types of tumours, and the relative values of extirpation and of irradiation in treatment. There are good photomicrographs of many representative tumours, a brief statement in tabular form of the main features and clinical course of all the cases, and a useful bibliography.

In *A Natural Golfer* (London: Thomas Murby, 10s. net) Dr. J. FORREST returns to the self-imposed and formidable task of converting the artificial golfer into a natural one. Once again the secrets of the successful golfer are traced to wrist action and fittingly caught and photographed. Most golfers live in the hope that the next round is going to be better than the last, and will open this book with the secret hope that there may be "something in it." What that is may best be seen in the lovely photographs of Jack Hobbs on page 83.

MEDICAL WORK OF THE MINISTRY OF PENSIONS

From the medical standpoint the most important practical task of the Ministry of Pensions is the provision of treatment. Few of those engaged in the work to-day can recall the extent of the institutional organization which has been in existence, and many of the institutions in former use are now mere names unassociated with any particular memory.

Institutional Accommodation since 1918

While the Ministry opened certain hospitals itself, for the most part the accommodation was taken over from the Services and for some time continued to be held under D.O.R.A. or under private arrangement with the owners of the property. Some were purely temporary hutted hospitals, others Poor Law institutions, mental hospitals, and private houses converted to general or special hospital use. The first hospital was acquired in February, 1918, but the acquisition of further hospitals during the continuance of the war was slow. By March, 1919, however, arrangements were in full swing for the transfer or setting up of hospital accommodation considered to be necessary to meet the problem with which the Ministry was faced, and by March, 1920, over 10,000 beds had been acquired, spread over forty-eight institutions controlled by the Ministry and used solely for the treatment of disabled ex-Service officers and men. The peak of the Ministry's institutional work was reached in 1921 when over 14,000 beds were acquired, not to deal with the whole of the Ministry's liability for in-patient treatment but only such part as needed special provision and in the main was not or could not be provided by existing civil institutions. Ministry accommodation provided less than 50 per cent. of what was required, for at the end of the year 1920–1 there were still nearly 31,000 pensioners in hospital, while during the year it had been necessary to treat 135,000 cases.

Altogether the Ministry has occupied at one time and another eighty-three hospitals and six convalescent centres, and the nine hospitals which still survive are for the most part replacements of the original war hospitals which had been closed because they had become unsuitable or were required for their original peace-time use.

The Position To-day

By March 31, 1938, the bed strength in Ministry hospitals had been reduced to 1,598, while the total number treated during the twelve months preceding that date had fallen to just over 6,000. There are, however, certain signs which suggest that a stage is being approached where reductions in the numbers requiring treatment characteristic of earlier years can no longer be looked for, and that indeed increases must be expected in some directions. Thus it is found that the total number treated during the year 1937–8 rose by 17, whereas there was a drop of 401 in the preceding year. Never before has the number in hospitals in succeeding winters approximated that of the previous year, but the number in the winter of 1937–8 was in fact in excess of that twelve months earlier.

With advancing years the disabilities, whether they be wounds or diseases, are becoming more in evidence and more and more resistant to treatment, thereby necessitating longer and more frequently repeated institutional care. Admissions themselves were in excess of the previous year and included no fewer than 473 cases for investigation, the difficulties and complexities of which are increasing as the war years recede into the background of the medical history.

Deaths in Ministry Hospitals

In spite of the greatly increased number of gravely ill pensioners the death rate in Ministry hospitals tends to diminish and is now only 2.2 per cent. of those admitted. Of the 138 deaths in Ministry hospitals during the year it is of interest to note that respiratory diseases (32.6 per cent.), diseases of the cardiovascular system (23.2), affections of the renal system (12.3), and malignant disease (8) account for 76 per cent. of the total. It is not until we come to septicaemia (6.5 per cent.) that any condition is approached which appears to be the late effect of a battle casualty apart from those respiratory diseases that have been accepted as being the result of poison gas. Investigation as to what extent direct enemy action during the great war was still responsible for deaths among ex-Service men reveals that battle casualties accounted for only 16.5 per cent. in 1936–7, though this increased to 24 per cent. in the year ending March 31, 1938.

Provision of Treatment

As heretofore treatment is provided by the Ministry itself only when facilities which are otherwise provided from public funds are not available, and the treatment of insane and tuberculous pensioners (other ranks) continues normally to be provided by the respective local authorities.

Of the total number of 13,659 other ranks provided with in-patient treatment during the year 6,133 received it in Ministry hospitals, 5,771 in mental hospitals, and 763 in sanatoria. The remaining 992 were those treated in civil hospitals, some of which are reserved exclusively for ex-Service patients, others only in part, the remainder being ordinary civil hospitals. Out of a total of 2,746 pensioners provided with out-patient treatment just over 2,000 were treated at Ministry clinics, the bulk of the work being undertaken at the special surgical clinics.

The supply of new artificial limbs reached over 4,000 and over 33,000 were repaired, while the death of 355 amputees was in part offset by 101 fresh amputations, of which 59 were primary and 42 re-amputations. The number of appliances provided by the Ministry continues to increase, and a substantial addition in the number of invalid chairs and tricycles supplied during the past year must be regarded as to some extent due to advancing years and progressive deterioration of the disabilities.

The amount of work done in the wards of each Ministry hospital is reflected in the activities of its ancillary services. All Ministry hospitals make use of the Central Laboratory at Roehampton for reports on their pathological specimens, 15,706 of which were dealt with during the year 1937–8, involving over 27,000 separate investigations. This is an increase of more than 2,000 over the figure for the previous year and affords an interesting indication of the growing need for investigation.

War's Aftermath

It will be seen from this brief review, which touches only one aspect of the Ministry's activities, how much has been done and still remains to do for those disabled by a conflict that raged twenty years ago. The record stands as an impressive warning of the prolonged suffering that follows in the train of modern warfare and as an appeal to the humanity of all nations to prevent such a calamity in the future.

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THE PITUITARY AND DIABETES

Ten years ago it was supposed that diabetes was due simply to a deficient secretion of insulin. In 1930 Houssay[1] and his collaborators observed that the symptoms of diabetes in depancreatized dogs were relieved by hypophysectomy, and subsequently that injection of crude extracts of anterior pituitary material into such "Houssay dogs" (hypophysectomized-depancreatized animals) caused diabetic symptoms to develop. Since that time the influence of the anterior pituitary on carbohydrate metabolism has been the subject of intensive study. Much of this work has been undertaken in this country by F. G. Young, who has recently reviewed the present state of knowledge.[2 3] Before Houssay's classical observations it was known that the glycogen stores of the liver were derived not only from carbohydrate but also from protein and fat, and that the mobilization of this glycogen to supply a constant blood-sugar level was controlled by a number of factors of which adrenaline was one of the most important. Adrenaline was also responsible for helping to convert tissue glycogen to lactic acid. The hypoglycaemic action of insulin was due to its powers of preventing the formation of glycogen in the liver, to its antagonistic effect on the mobilizing function of adrenaline, and to its facilitating the conversion of blood sugar to tissue glycogen. If the supplies of carbohydrate were adequate the conversion of fat to glycogen was prevented by insulin. In the process of this conversion there was a tendency to liberation of ketone bodies, so that insulin in the presence of glucose diminished the tendency to ketosis.

F. G. Young[4] has shown that administration of crude anterior pituitary extracts to normal dogs gives rise to hyperglycaemia, glycosuria, and ketonuria. With small constant doses this diabetogenic effect tends to disappear, but can be made to reappear if the daily dose is increased, and if large doses are given the dogs are rendered permanently diabetic.[5] These animals, however, can survive indefinitely without insulin treatment and can readily manufacture sugar from protein,[6] so that, provided they are supplied with a high protein diet, their body weight is maintained or even increased. It appears that this diabetogenic effect is due not to inhibition of secretion of insulin but to the raising of the threshold of sensitivity to it.[7] Young[8] found that extracts of the lactogenic hormone of the anterior pituitary, prolactin, possess this diabetogenic activity, though he[9] subsequently demonstrated that the "glycotropic factor" is a contaminant of, but not identical with, prolactin. Although crude extracts of the anterior pituitary are "diabetogenic" neither prolactin nor the glycotropic factor will raise the blood-sugar level in intact animals, though they will provoke glycosuria in "Houssay dogs."[10] Furthermore, neither prolactin nor the glycotropic factor will induce ketonuria either in the intact[11] or in the "Houssay" animal.[10] So at least three different factors would appear to be required to produce the "diabetogenic" effect in the intact animal: the glycotropic factor, the ketogenic factor, and a factor responsible for inducing glycosuria in the intact animal. Further information as to the mode of action of the glycotropic factor is provided by the observations of Himsworth and Scott[12] that this substance is equally active in adrenalectomized animals, and that its effect therefore is not brought about by increasing the glycogenolytic power of adrenaline. In a histological study of the pancreatic islets in diabetic animals Richardson and Young[13] observed that, whereas in dogs rendered permanently diabetic there is evidence of degeneration of the Langerhans tissue, in rats receiving crude extracts of anterior pituitary there is an increase in the amount of islet tissue, and in dogs receiving small daily doses active mitosis of the cells is found. This is of significance in view of the observation that such animals tend to become resistant to the diabetogenic effect of small doses, and supports the evidence for the existence of a "pancreatropic" factor of the anterior lobe. Yet another aspect of this pituitary activity is the self-limiting mechanism which appears to be a function of all anterior pituitary factors. Young[14] has shown that by continuous treatment of monkeys with glycotropic substance it is possible to develop an "anti-prolactin" in the serum, though this antigenic substance does not appear to be consistently anti-glycotropic.

The story is by no means complete, but enough has been told to show that the normal animal, and presumably the normal human being, like the "Houssay dog" lives "precariously balanced between hypoglycaemia and diabetes," and that this balance depends on the efficient interaction of the anterior pituitary and the pancreas. It is still too early to apply these discoveries clinically, but we

[1] *Endocrinology*, 1931, **15**, 511.
[2] *Lancet*, 1936, **2**, 237, 297.
[3] *Proc. roy. Soc. Med.*, 1938, **31**, 1305.
[4] *Biochem. J.*, 1938, **32**, 513.
[5] Young, F. G. *J. Physiol.*, 1938, **92**, 15P.
[6] Marks, H. P., and Young, F. G. Ibid., 1938, **93**, 61.
[7] Cope, O., and Marks, H. P. *J. Physiol.*, 1934, **83**, 157.
[8] Ibid., 1936, **87**, 13P.
[9] *Chem. Ind.*, 1937, **55**, 237.
[10] Long, C. N. H. *Medicine*, 1937, **16**, 215.
[11] Young, F. G. *Biochem. J.*, 1938, **32**, 524.
[12] *J. Physiol.*, 1938, **91**, 447.
[13] Ibid., 1937, **91**, 352; and *Lancet*, 1938, **1**, 1098.
[14] *Biochem. J.*, 1938, **32**, 656.

may look forward confidently to a third milestone in the history of the treatment of diabetes which may prove to be not less important than the discovery of insulin by Banting and Best or the introduction by Hagedorn and Scott of the protamine-zinc-insulin compound.

RAW AND PASTEURIZED MILK

Two reports have already been issued describing work carried out under the supervision of the Milk Nutrition Committee on the comparative nutritive value of raw and commercially pasteurized milk. The first dealt with observations on rats, the second on school children. A third report[1] is now published dealing with experiments on calves carried out at the National Institute for Research in Dairying, Reading, and at the Rowett Research Institute, Aberdeen. At Reading sixteen pairs of bull calves from tubercle-free herds were compared. One animal in each pair was fed on raw and the other on pasteurized milk from the same source. The milk was given in proportion to the weight of the animals. A hay supplement was included after eight weeks and a meal supplement after seventeen weeks. The experiment terminated after twenty-six weeks. In assessing the results five pairs of calves were omitted on the ground that three calves on raw milk died of pneumonia, one calf on raw milk was ill, and one calf on pasteurized milk had intestinal obstruction. The average weight of the remaining eleven pairs was 453.9 lb. in the raw group and 454.36 lb. in the pasteurized. Body measurements showed a slight but insignificant advantage in favour of the animals on raw milk; but, since the difficulties of obtaining uniform measurements in calves are said to be great, little weight can be attached to this difference. Examination of the raw milk showed that 30 per cent. of samples contained tubercle bacilli, in spite of the fact that it came mainly from accredited herds. None of the pasteurized samples was found to be infected. Tuberculin tests made towards the end of the experiment showed that eight out of the eleven calves on raw milk and one out of the eleven on pasteurized milk reacted positively.

At Aberdeen two experiments were carried out on the same general lines as at Reading. In the first experiment six heifer and ten bull calves were included in each group. Milk was fed according to appetite up to four months and then limited to 20 lb. per head per day. Hay was not given, but oat straw was fed freely throughout. Meal was added after four months. In the second experiment ten pairs of bull calves were observed, milk being limited to 15 lb. daily, and meal added as soon as the calves would eat it. The milk supplied was the same in both experiments. Of the raw milk 74 per cent. of samples contained tubercle bacilli and 74 per cent. *Br. abortus*; of the pasteurized milk 7 per cent. of samples contained tubercle bacilli and 5 per cent. *Br. abortus*, though it is stated that the phosphatase test was uniformly negative. In the first experiment, omitting two calves that died in the raw milk group and one in the pasteurized, the average weight at 183 days of the animals fed on raw milk was 417.9 lb. and of the animals fed on pasteurized milk 402 lb. This difference cannot be regarded seriously, since throughout the experiment the growth curves of the two groups of animals were frequently crossing each other, and it so happened that at the time the experiment came to an end the animals on raw milk were in the ascendant. In the second experiment the average weight of the animals at the end of 187 days was 379.6 lb. in the raw group and 352.2 lb. in the pasteurized. In neither experiment was the difference in weight statistically significant. In the first experiment four calves in the raw group and three in the pasteurized reacted to tuberculin; in the second experiment the numbers were four and one respectively.

There are several different ways of carrying out experiments of this sort, and the answer obtained necessarily depends on the type of procedure adopted. Wilson, Minett, and Carling at Peppard endeavoured to make a pure comparison of the nutritive value of raw and pasteurized milk. For this reason they used calves from a healthy herd and fed them with milk that was free from both the tubercle bacillus and *Br. abortus*. As a result none of their animals became infected, and the results were not vitiated in any way by disease. Wilkie, Edwards, Fowler, and Wright at the Hannah Dairy Research Institute wanted to compare the general effect of raw and commercially pasteurized milk. For this reason they used animals from tuberculosis-free herds, fed them on ordinary raw and pasteurized milk, and kept them under completely separate housing conditions. The result was that twenty-four out of the thirty-six animals on raw milk became infected with tuberculosis and not one of the animals on pasteurized milk. In both these experiments, it may be noted, the average gain in weight of the animals was either equal or slightly higher in the pasteurized than in the raw group. The Reading and Aberdeen workers seem to have fallen between two stools. Some of their animals came from tuberculin-tested herds and others did not. Ordinary raw and pasteurized milk were given, but the animals were all housed together. It is not surprising, therefore,

[1] Milk and Nutrition. Part III. New experiments reported to the Milk Nutrition Committee. The effect of commercial pasteurization on the nutritive value of milk as determined by experiments on calves. Poynder and Son, Reading. 1938. Price 2s.

that some of the animals in the pasteurized group became infected with tuberculosis, even at Reading, where no tubercle bacilli were ever found in the milk after pasteurization.

Taking together all the experiments that have been made in Great Britain on calves, amounting to 250 animals distributed into approximately two equal groups, the weighted mean increase in weight per calf per day works out at 1.232 lb. for animals fed on raw and 1.273 lb. for animals fed on pasteurized milk. It is possible that if the raw milk used in all these experiments had been free from infection the results might have been different; but so far as the experiments go there is nothing in them to show that the total nutritive value of milk, when tested on what is presumably the most sensitive animal, the calf, is decreased by holder pasteurization, while there is a great deal to show that the serious risk of developing tuberculosis and possibly pneumonia incurred by calves fed on ordinary raw milk can be more or less completely avoided by adequate pasteurization of the milk and protection of the calves from other sources of infection.

SURGICAL RESEARCH

One of the outstanding events of the past year in the world of surgical research was the opening of the Bernhard Baron Research Laboratories of the Royal College of Surgeons of England on December 8, 1937. It is therefore with special interest that we greet the scientific report of the College for 1937–8, containing as it does a record not only of manifold activities in the various departments of the museum but also of much valuable research carried out both during the construction and since the inauguration of the new laboratories. The section of the report dealing with the collections housed in the museum reveals that the hard work engendered by the necessity for repair and remounting of specimens, and particularly the preparation and cataloguing of new specimens, has been well rewarded in view of the ever-increasing number of medical and dental students, nurses, and members of first-aid classes who have visited the museum. In addition, workers have come from all parts of the world to study particular specimens or groups of specimens. The museum staff is to be congratulated on the speed and skill with which new acquisitions have been made ready for exhibition. Outside scientific bodies and individual investigators have been assisted in their work by the ready provision of reports on material—particularly archaeological and pathological—submitted to the College for opinion, and drawings and photographs of specimens have been supplied on request in order to facilitate research or to illustrate books and lectures. The museum is indeed unique in the services it renders to medicine. Although work was necessarily interrupted by the change-over from temporary quarters into the Bernhard Baron Laboratories, which were not in running order until early in February, the progress made during the past year in a variety of investigations more than justified the erection of this new institute, with its greatly increased facilities for physiological and surgical research. The experimental work on the surgery of the heart, which, as is already well known, has proved of great clinical value in the treatment of cardiac ischaemia in man, has been pursued a stage further. An experimental investigation of the treatment of the acute coronary occlusion occasionally complicating the post-operative course in such cases is now in progress. The development of essential hypertension and its possible causes have been the subject of experiment, supplemented by operative treatment of a number of clinical cases of essential hypertension and of hypertension secondary to renal disease. If the end-results of these operations prove as satisfactory as the immediate ones they will no doubt inspire further experimental work. Among other investigations that have already been of value to clinicians are those on surgery of the lung—especially with regard to lobectomy, grafting, and the production of pleural adhesions—on unilateral oedema, and on intestinal strangulation. The aetiology of thyrotoxicosis is another subject of recent study. Other researches deal with such varied matters as the nervous control of carbohydrate metabolism, traumatic shock, homogeneous nerve grafts, the sympathetic innervation of the adrenal glands, the nerve supply of the ureter, and peptic ulceration. The new institute at the Royal College of Surgeons, providing as it does facilities for postgraduate research to workers not only in this country but also from the Empire, fulfils a long-felt want and will, we hope, receive the support it so abundantly deserves.

EXTRAPLEURAL PNEUMOTHORAX

The induction of an extrapleural pneumothorax as a collapse method in the treatment of pulmonary tuberculosis is not a new procedure. As far back as 1891 Tuffier showed that it was possible to create a free space between the parietal pleura and the endothoracic fascia, but he was unable to keep this extrapleural space patent by injections of air. Hence he and others after him endeavoured to maintain collapse of the diseased lung by introducing into this space such substitutes for the air as omentum, fat, muscle, or even rubber. Baer in 1915 applied paraffin to this end, and this led to the general adoption of apicolysis with "plombage," an operation that is finding less and less favour because of the unsatisfactory remote results in many hands. Refills with air were then tried again by other workers, notably Romanis and Riviere, Nissen, and Zorini, but it is only since Graf and, later, Schmidt published their successful results in 1936 that this method has been used by an increasing number of surgeons. Among recent papers on this subject attention may be drawn to two from the United States and France. P. N. Coryllos[1] traces the history of the operation and describes in detail his own technique. He suggests that Graf succeeded where

[1] *Quart. Bull., Sea View Hosp.*, 1938, **3**, 264.

others had failed because in the operation he performed the pleurolysis was extensive, whereas previously the separation had been limited to the apical region. Coryllos has now carried out the operation twelve times, and he gives a full account of three cases. Reviewing the immediate results in these twelve patients, he concludes that the procedure is a reasonable one and that it is worth trying in selected cases, but he doubts the possibility of maintaining a large extrapleural space for a sufficient length of time. Pierre-Bourgeois and Mario Lebel[2] state that for localized fibrocavernous lesions in patients whose general condition is good they prefer to perform a thoracoplasty, but certain of these patients who will not agree to a thoracoplasty being performed may submit to an extrapleural pneumothorax; in young women particularly aesthetic reasons may weigh strongly against the former operation. But thoracoplasty and extrapleural pneumothorax are in no sense rival operations. The latter is indicated chiefly in cases that would be suitable for a thoracoplasty but in which the general condition of the patient does not permit it, patients in whom up to the present an apicolysis with plombage or a phrenic interruption might therefore have been undertaken. Lastly, excellent immediate results may be obtained by an extrapleural pneumothorax where there are fairly extensive infiltrative lesions in patients whose temperature and weight are satisfactory but in whom an artificial pneumothorax cannot be induced. Though they do not give details of the number of patients they have treated, Pierre-Bourgeois and Lebel seem to be favourably impressed by the operation, but they stress the possible complications of haemorrhage and infection, and emphasize that at least two or three years must pass before a definite opinion as to the value of this method of collapse can be formed. The present state of collapse therapy is such that further possibilities are still being explored, and recently the induction of an artificial anterior pneumomediastinum has been recommended. Although Montuschi[3] believes that the procedure is without danger, the evidence he advances on behalf of this method of treating pulmonary tuberculosis is slender, and, indeed, the method appears to be physiologically unsound.

BIO-ECONOMICS

When Edmund Burke sent to the sheriffs of Bristol the last Acts passed with regard to "troubles in America," he remarked that "it affords no matter for very pleasing reflection to observe that our subjects diminish as our laws increase." A new book[4] on the intrinsic merits and extrinsic defects of what is called democracy reminds one of Burke's remark. Sundry quotations from speeches by eminent Englishmen—of which at least one is faithfully dealt with by Mr. Yahuda—do little to mitigate a sense of melancholy. Mr. Yahuda seeks to analyse the social and economic phenomena of modern societies, particularly our own, from a biological standpoint—that is, from the point of view of determining how far they favour or hinder the growth and survival of the best citizens and the stability of a human society. Perhaps the path he follows is not quite so new as he supposes, and certainly the arguments which lead him to infer that the health of the people of this country is undergoing a general retrogression are weak. But he writes modestly, and much that he says is only too true. Mr. Yahuda is fond of diagrams, in particular one of what he calls the quadripartite pattern. Society tends to consist of an upper and a lower stratum, each of which is divided vertically into "fit" and "unfit" sections. It is this division which may lead to dissolution of the society. In our society the favoured unfit and the non-favoured fit are too numerous. This is, of course, far from being a novel idea, but Mr. Yahuda develops it patiently and with good illustrations. As we have only too good reason to know, a democracy—whether the pseudo or partial democracy which still survives or the real democracy of the small city States of Greece—is seldom an efficient organization for war. The Romans provided for this defect by the formal expedient of dictatorship. Modern democracies have relied on informal dictatorships. Whether this will prove enough to secure survival of the State form remains to be seen. At present the tide is running strongly against democracy, but it may be only a tide.

BIOPSY IN SCHIZOPHRENIA

A useful method of studying the pathology of the living is to secure biopsy specimens either by puncture or by excision. Recently Elvidge and Reed[1] have applied this method to nineteen cases of schizophrenia and manic-depressive psychoses. The patients were anaesthetized and brain substance was obtained by cerebral puncture. In eleven of the thirteen schizophrenics and in all the remaining cases they found swelling of the oligodendroglia cells. On seven of these cases a second biopsy was carried out at a later date, and in six the same condition was observed. For control purposes a comparable biopsy was performed on sixteen non-psychotic patients. Of these, only five showed swelling of the oligodendroglia, and four of the five were epileptics. Control experiments on animals were also carried out, with negative result. The authors conclude that schizophrenia and manic-depressive psychoses are associated with demonstrable histological changes in the brain, that they can occur as a chronic process, and that they are a part of massive physiological disturbances in the associative and commissural pathways in the brain and therefore responsible for the mental phenomena of the psychoses—disturbance and loss of control in the intellectual, volitional, and emotional fields. On the basis of these findings they consider that it is justifiable to assume that there may be a causal toxic or metabolic factor. These observations are obviously of considerable importance. The quest of the pathology of the "endogenous" psychoses has been a long one and has formed the goal of many hopeful investigations doomed

[2] *Presse méd.*, 1938, **46**, 818.
[3] *Post-grad. med. J.*, 1938, **14**, 216.
[4] *Bio-Economics*. By Joseph Yahuda, LL.B. London: Sir Isaac Pitman and Sons. 7s. 6d.

[1] *Arch. Neurol. Psychiat.*, Chicago, 1938, **40**, 227.

to frustration. The attack by biopsy is a bold method and is designed to avoid the disturbances caused by agonal and post-mortem changes. Nevertheless, it itself is not entirely free from the possibility of criticism. Scholz[2] has said that small portions of brain tissue, obtained fresh and preferably by biopsy, are in a high degree susceptible to artefacts produced by the hardening process. Dr. Penfield, however, has stated that he has never seen marked swelling in the oligodendroglia cells in bioptic material without there being some disturbance in the consciousness of the person from whom the tissue came. It is very much a matter of debate what significance, if any, can be attached to swelling of the oligodendroglia. It is, as a rule, considered to be an acute change and not one that can persist uninterruptedly for a prolonged period of time. Examination by biopsy is well worth a trial where facilities are available. There are, however, few English clinics which would use such a measure when operation was not on other grounds advisable. With further experience the special advantages and disadvantages of the method will come to be better known. Confirmation of these results will be required before a solid basis for further work on these lines is possible. Even then knowledge may be but little advanced, and such pathological findings may show themselves to be concurrent changes and not of aetiological significance. Much excellent biochemical work has succeeded only in reaching such a paltry conclusion.

PATHOLOGY OF RETINITIS PIGMENTOSA

The very name "retinitis pigmentosa" is a hybrid of fallacious pathology and doubtful physiology. Whatever the nature of the lesion it is not an inflammation of the retina, and that the pigmentary disturbances are not an essential feature of the process is shown by the existence of the subvariety of retinitis pigmentosa sine pigmento. The experimental work of Wagenmann, who studied the effect of cutting the short posterior ciliary arteries in rabbits, tended to implicate the choroidal circulation as the seat of the primary lesion, but the hereditary character of the affection and some histological features point to the retina rather than the choroid. Wagenmann's work, which was accepted as valid for many years, has recently been challenged,[3] and opinion as to whether the primary lesion is one of the retina or of the choroid is still divided. The histological features of retinitis pigmentosa have led equally weighty authorities to support both views. General studies on the whole have been unhelpful until the recent revival of interest in the Laurence-Biedl syndrome with its widespread disturbances. Zondek,[4] in particular, and many Italian writers have insisted on the endocrine basis of the disease; but the evidence is far from conclusive, and especially so in the case of attempts to single out a pituitary disturbance as the essential feature. Considerable interest therefore attaches to the work of E. C. Dax,[5] who has shown that the blood and urine of twenty patients with retinitis pigmentosa contain a substance which on injection into frogs disperses the melanosomes of the skin. The same effect is produced by the urine of patients with pituitary abnormalities or by urine excreted at times when the gland is subjected to physiological stress, as in menstruation. This wider view of retinitis pigmentosa, however, still leaves unsolved the problem as to the primary seat of the affection, though it tends to support the belief in an essentially retinal origin. The conception of retinal abiotrophy,[6] though criticized as an escape into mere terminology, has by now yielded sufficiently valuable results in the discrimination of a large group of degenerative lesions to gain a new meaning. That retinitis pigmentosa is fundamentally a slow and premature death of the fully organized retina is further borne out by the investigation of this condition in a batch of rats undertaken by Bourne, Campbell, and Tansley.[7] The material at their disposal enabled them to make something like an experimental study of the lesion in the retina at different stages, and their evidence is distinctly against the choroid as the primary source. It is not easy to see just how far a pituitary disturbance fits into such a picture. Assuming that it can be proved that such disturbances are invariably present in retinitis pigmentosa the question still remains as to whether the pituitary disorder is the primary factor or whether it is merely an associated condition arising out of the same underlying cause. Much more confirmatory evidence is needed before it can be accepted that retinitis pigmentosa is a pituitary dysfunction and nothing more. This view will also have to be harmonized with the evidence available on the rather ill-understood role of vitamin disturbances in the affection, as also with the pigmentary degeneration of the retina which can be experimentally induced by sodium iodate.

TROPICAL MACROCYTIC ANAEMIA

It seems clear that one of the fundamental causal factors in tropical macrocytic anaemia is a dietetic deficiency and that similar anaemias in varying degree are widespread. Hamilton Fairley and his colleagues[8] have therefore suggested that the condition should be called nutritional macrocytic anaemia, and as a result of their observations in Macedonia they divide this into two varieties: a non-haemolytic and a haemolytic. The first variety is rare in Macedonia and seems to arise from uncomplicated dietary deficiency, whereas the second is common and appears to be due to dietary deficiency complicated by chronic malaria. Malaria exerts its action not directly on the red cell but through the increased phagocytosis of abnormal red cells derived from a pathological bone marrow by a reticulo-endothelial system activated and hypertrophied, it is thought, as a result of chronic malarial infection. A remarkable feature of these cases was the resistance to treatment. Massive doses of marmite (60 grammes

[2] *Z. ges. Neurol. Psychiat.*, 1933, **145**, 471.
[3] *Trans. ophth. Soc. U. Kingdom*, 1938, **581**, 252.
[4] *Diseases of the Endocrine Glands*, London, 1935.
[5] *Brit. J. Ophthal.*, 1938, **22**, 345; *Trans. ophth. Soc. U. Kingdom*, 1938, **581**, 227.
[6] *Int. Congress Ophthal.*, Washington, 1922, **1**, 103; *Trans. ophth. Soc. U. Kingdom*, 1934, **54**, 160.
[7] *Trans. ophth. Soc. U Kingdom*, 1938, **581**, 234.
[8] *Trans. roy. Soc. Trop. Med. Hyg.*, 1938, **32**, 132.

or more daily) or liver extract (6 to 8 c.cm. campolon daily) were required to produce maximal reticulocytosis and blood regeneration; and even so the blood counts increased slowly. As the reticulocyte response was generally adequate it seemed that blood regeneration, even if adequately initiated, could not be maintained, or, in accordance with the general theory of the authors, though satisfactory blood regeneration was taking place the new blood was being destroyed by the hypertrophied reticulo-endothelial system. Another interesting question is the relation of tropical macrocytic anaemia to pernicious anaemia. From observations both on the experimental deficiency anaemia of monkeys (the supposed animal counterpart of human tropical macrocytic anaemia) and on the human disease itself, Wills and Evans[9] claim to have shown that, whereas crude liver extracts are effective, the highly purified extracts so potent in pernicious anaemia are relatively inert, even in enormous doses. They state that in tropical macrocytic anaemia anahaemin, although the doses used were very high, produced no clinical improvement, no reticulocyte crisis, and no appreciable rise in the red cell count, and that similar results were obtained with examen; Napier and his colleagues[10] support this opinion respecting anahaemin. These observations would suggest that uncomplicated tropical macrocytic anaemia is due to a deficiency in the diet of some factor other than Castle's extrinsic factor. The precise nature of this new factor, present in crude liver and autolysed yeast extracts, has not yet been demonstrated, though it does not appear to be vitamin B_1, B_4, lactoflavin, or nicotinic acid. However, until its identification and isolation are completed and its relation to other haematopoietic factors is determined, all cases of tropical macrocytic anaemia should be treated by the cruder liver extracts or by marmite; and, furthermore, the effect of any secondary haemolytic factor, such as chronic malaria, on the dosage required to produce a therapeutic response must be kept in mind.

[9] *Lancet*, 1938, **2**, 416.
[10] *Indian med. Gaz.*, 1938, **73**, 385.

PASTEUR INSTITUTE, 1888-1938

The Pasteur Institute in Paris, which celebrated its fiftieth anniversary this week, was opened on November 14, 1888, by the President of the French Republic in the presence of a distinguished gathering in the large library. It may be of interest to record one or two incidents that took place on this historic occasion. Dr. Grancher, who spoke after the proceedings had been opened by a brief speech from M. Bertrand, the secretary of the Academy of Science, inveighed against the opponents of the "Pasteurian method," and favourably contrasted the action taken by the Committee of Investigation appointed by the English Government. Dr. Grancher recorded that since the middle of 1885, when the first two patients were inoculated against rabies, 5,384 persons had passed through the laboratories at Rue d'Ulm and Rue Vauquelin. At that time twenty laboratories had been established for preventive inoculation: seven in Russia, five in Italy, and one each in Rumania, Austria, Brazil, Cuba, and the Argentine Republic—one was shortly to be opened at Chicago and one in Malta. After Dr. Grancher had spoken M. Christophle, the treasurer of the Fund, reported that the subscriptions, including handsome donations from the Czar of Russia and the Sultan, amounted to over £100,000, three-fifths of which had been spent in building and equipping the Institute, leaving only £40,000 as capital for an endowment fund. The Government had been making a grant of £5,000 a year, but Pasteur and his committee hoped to obtain further private subscriptions which would render the Institute independent of the State. When the time came for Pasteur to speak he was so overcome that the speech which he had prepared had to be read by his son. It is worth recalling that Joseph Meister, at present lodgekeeper of the Institute, was the first person to be treated by Pasteur's method: this was on July 6, 1885, when at the age of 9 years he was bitten by a mad dog.

BRITISH HEART JOURNAL

At the beginning of next year the British Medical Association will increase its services to medical science by publishing quarterly a special journal devoted to diseases of the heart and of the circulation, under the title *British Heart Journal*. This journal, which is being published at the request of the Cardiac Society of Great Britain and Ireland, will be jointly edited by Dr. Maurice Campbell and Dr. Evan Bedford, assisted by an editorial board appointed by the Cardiac Society. Diseases of the heart and the circulatory system form the first of the principal certified causes of death at all ages in this country, and it is therefore a matter of surprise that such a journal is not already in existence in view of the gravity of the conditions which will form the subject-matter of this new publishing venture. We do not, of course, forget *Heart*, which for many years was edited by Sir Thomas Lewis and held a unique place in the medical literature of the world—a position still maintained with change of title to *Clinical Science*, but happily without any change of editorial guidance. The research work in experimental medicine that is carried out under the leadership of Sir Thomas Lewis, the reports of which appear in his journal, are of supreme importance to medicine, and represent a field of activity that probably will only be incidentally surveyed in the *British Heart Journal*. In the new periodical one may expect to find work more concerned with the everyday diagnosis and treatment of patients, and so of immediate value to the practising physician. Its obvious appeal will, of course, be to the specialist in heart disease or "cardiologist," both in this country and in others, but we would, too, strongly commend it to all physicians to whom the stethoscope of Laennec has become the badge of their tribe. In shape and form it will be similar to the other two specialist journals published by the B.M.A., and it will be priced at 25s. a volume of four numbers.

We regret to announce the death, on November 14, of Patrick Watson-Williams, M.D., consulting surgeon in charge of the Ear, Nose, and Throat Department, Bristol Royal Infirmary. We hope to publish a memoir next week.

SURGICAL PROCEDURES IN GENERAL PRACTICE

This is one of a series of articles contributed by invitation

INNOCENT TUMOURS OF THE BREAST

BY

W. SAMPSON HANDLEY, M.S., F.R.C.S.

Unless the diagnosis is certain and the tumour of very moderate size, the removal of a benign swelling of the breast should not be undertaken as an exercise in minor surgery. While in some cases, as in the mobile fibro-adenoma of the young woman in her twenties, the lump may be unquestionably innocent, in a woman over 40 a clinically similar lump may prove to be a mobile carcinoma, for which an immediate radical operation is desirable. In some cases an immediate frozen section by a pathologist in attendance may be necessary to settle the question, and if malignancy is reported it is desirable, though not absolutely essential, that immediate radical operation should follow. If this is not possible the wound should be immediately sewn up and the patient sent to a fully equipped hospital. In any case where cancer is suspected the scope of the exploratory operation should be as restricted as possible, and the incision should be one which will not prejudice a subsequent radical procedure—that is to say, the lump should be approached by a small incision made directly over it, and not by an indirect or marginal incision. It is a safe rule that no case in which a carcinoma may be present should be submitted to exploration unless the surgeon's experience and environment justify, if necessary, an immediate major intervention.

FIG. 1.—The method of approach to the tumour

It is a mistake to minimize to the patient beforehand the importance of even a small operation, for this will make it more difficult to control her during convalescence. Even a small wound takes a week to heal firmly. In a vascular organ such as the breast rest for a week with the arm in a sling should usually be insisted on. Early movement is likely to produce a troublesome haematoma, which will delay recovery and may possibly require evacuation. Owing to the close relation of the great pectoral muscle to the breast early movement of the arm is very undesirable.

The dressing applied should maintain elastic pressure upon the field of operation, and, except for the smallest operations, a many-tailed bandage is best, as it ensures uniform support for the whole breast.

Removal of an Encapsuled Fibro-adenoma

A direct approach to the tumour is usually best by an incision radiating from the nipple so as to avoid division of main ducts and situated over the most prominent part of the swelling. The tumour should be steadied and made prominent by fixing it between the thumb and index finger of the left hand (Fig. 1). A firm cut is made right down to the tumour and through its capsule (Fig. 2). The latter is an essential point, for the plane of easy enucleation is not between the tumour and its surroundings but between the capsule of the swelling and the tumour substance itself. With a blunt instrument—a blunt dissector, a closed artery forceps, or the gloved finger—the enucleation is now carried out, as a rule without difficulty (Fig. 3). The cavity is then inspected to see that no lobules of the tumour have been left behind. Some surgeons advise that the capsule should now be separately excised, but I think this is unnecessary. The cavity is examined for bleeding points, which should either be carefully ligatured or else underrun with a fine semicircular needle carrying a ligature, which is then tied over the bleeding point. The latter is the safer plan. With a similar needle the cavity left should be obliterated by approximating its sides. The needle takes a grip first of one lateral wall of the cavity and then of the corresponding point on the opposite wall. The ligature is now tied. Two or three such stitches may be necessary (Fig. 4). A narrow strip of corrugated rubber may be put in as a drain for twenty-four hours, but should not be left longer. It only remains to insert the skin sutures. Double horsehair, which is elastic and non-absorbent, leaves little mark if not left in too long,

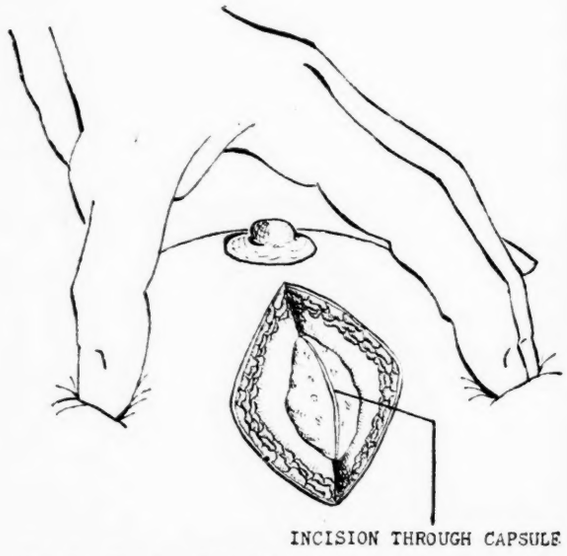


FIG. 2.—Showing the incision down to the tumour and through its capsule.

or thin silkworm-gut or clips may be preferred. Special care must be taken that the skin edges are not inverted and are accurately coapted. If an invisible scar is hoped for the stitches must be removed early—say on the fourth or fifth day. After their removal it is well to apply a single layer of gauze over the wound and to paint it with collodion. This will prevent gaping of the incision.

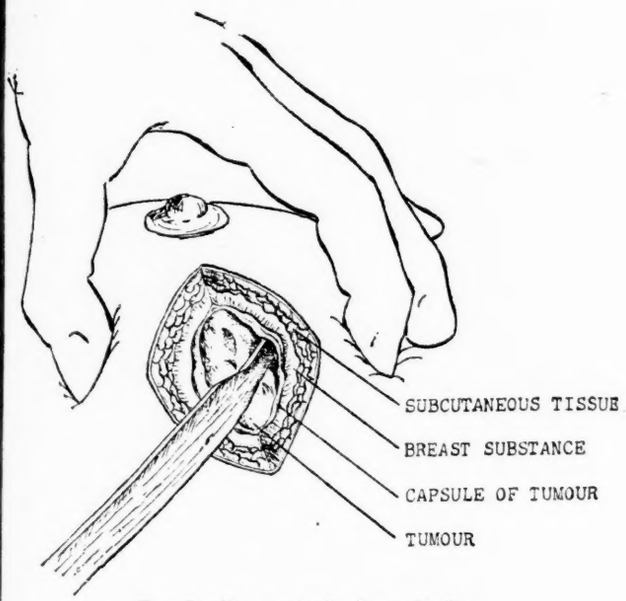


FIG. 3.—The method of enucleation.

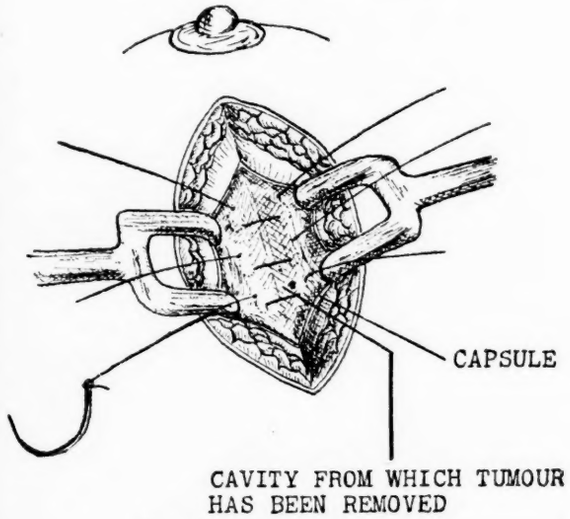


FIG. 4.—Obliterating the cavity.

Unencapsuled Fibro-adenoma

Certain fibro-adenomas have no capsule and cannot be enucleated. They can only be removed by cutting round the tumour, preferably with curved scissors, where it merges into the surrounding breast. If a fibro-adenoma proves to be non-enucleable a suspicion of carcinoma should be aroused.

Gaillard-Thomas Method

In cases in which it is desirable to avoid a scar over the surface of the breast access to the outer position of the organ can be obtained from the posterior surface by the Gaillard-Thomas marginal incision (Fig. 5). The operation, however, may be attended by free bleeding, and lies on the edge of the domain of minor surgery. At least a dozen artery forceps should be available. Usually the incision begins in the axilla just under cover of the lower

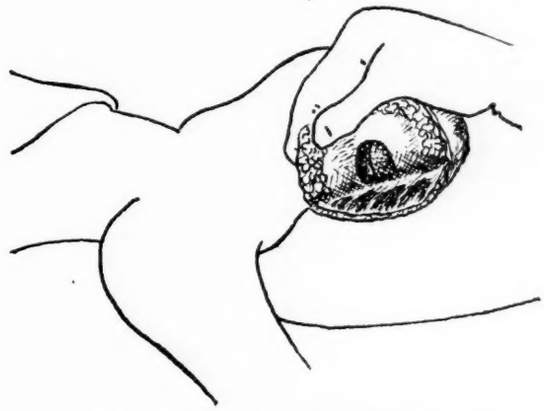


FIG. 5.—The Gaillard-Thomas marginal incision.

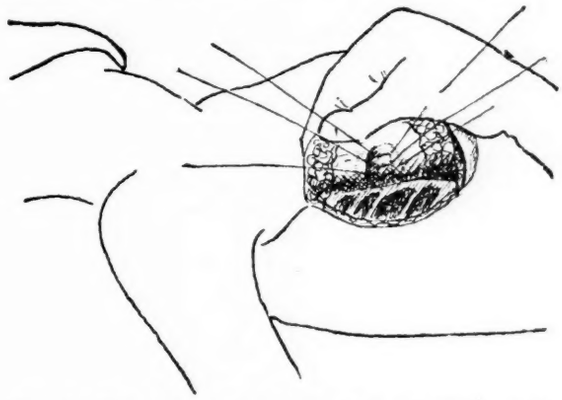


FIG. 6.—The cavity as it appears after enucleation of the tumour.

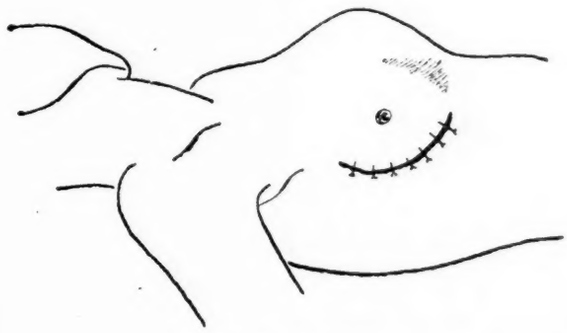


FIG. 7.—The skin sutures.

edge of the great pectoral muscle, and follows downwards the curved outline of the breast for the requisite distance according to the freedom of access required. If the tumour is near the lower edge of the breast the incision will follow the submammary sulcus. The incision is deepened down to but not through the deep fascia, and then, partly by blunt dissection, the breast is raised from the fascia until the tumour can be felt through its posterior surface, which is turned over until the tumour presents. An incision is now made through the posterior surface of the breast, the tumour exposed and enucleated, and the cavity obliterated as already described (Fig. 6). The breast is turned back into position and a drainage-tube inserted after careful haemostasis. Only few skin sutures are necessary (Fig. 7), and healing is usually rapid and satisfactory.

The weakness of the Gaillard-Thomas method is that if the tumour proves after all to be malignant a subsequent satisfactory radical operation is made difficult or is impossible. This incision should not be used if there is any doubt as to the diagnosis.

Pathological Examination Essential

Cases are on record in which, after the removal of a fibro-adenoma, carcinoma has appeared beneath the scar within a few months. The supposed fibro-adenoma, if microscopically examined, would almost certainly have proved to be a carcinoma. Remembering such facts, no conscientious surgeon will remove a portion of tissue from the breast without sending it for microscopical examination. To this rule there should be no exception, for carcinoma has been found in the interior of an apparently undoubted fibro-adenoma.

Doubtful Breast Swellings

The condition which most often arouses suspicion of early carcinoma is chronic mastitis, especially of the cystic variety. Chronic mastitis has already been considered.* This condition affects the breast by lobes, attacking certain lobes and often sparing others. The upper and outer quadrant is the most common site, as for carcinoma. Chronic mastitis, especially of the cystic variety, is a precancerous condition, though it may be many years before the change to cancer supervenes, and that change may never occur. The swellings of chronic mastitis are vague, mobile, finely granular, sector-shaped, and free from adhesion to skin or fascia. The lymphatic glands may be enlarged and tender, but they are elastic and not hard. Swelling and tenderness of the breast are maximal just before the period starts, and rapidly subside once it has begun.

In its typical form, and especially under the age of 40, mastitis is best dealt with by a short course of *x* rays to the breast, and the question of surgery will not arise. But in women who have reached the cancer age mastitic swellings should be examined every three months, even after *x*-ray treatment has been given.

A watch should be kept for certain danger signals which indicate the likelihood of early supervention of carcinoma. These are:

1. The appearance of multiple hard lumps, probably cysts or fibro-adenoma, in the mastitic area.

2. Deviation of the axis of the nipple on the affected side.—The normal nipple looks forwards, downwards, and outwards. Fibrous tissue occurring in the mastitic area tends to tilt the nipple in the direction of that area. Thus in mastitis of the upper and outer quadrant the nipple is likely to point forwards and outwards, not forwards, outwards, and downwards.

3. Duct retraction.—This sign must not be confused with retraction of the nipple. Upon the normal nipple there are fifteen to twenty openings, one for each lobe of the breast. If one of the lobes becomes fibrotic the contraction of the new fibrous tissue pulls upon the corresponding duct, which then appears as a tiny depression upon the surface of the nipple. Several such depressions may be present.

4. Elevation of the nipple may occur owing to the pull of mastitic fibrous tissue upon it as a whole.

5. Incipient adhesion of skin to the lump.

6. Incipient retraction of the whole nipple.

If some of these signs appear it may be necessary to advise the removal of a portion of the breast for microscopical examination, preferably by frozen section, with leave to proceed to a mastectomy if necessary.

* See article by Mr. Cecil Rowntree in the *Journal* of November 12.

Technique of Biopsy

Under proper aseptic conditions, with preparation of the skin by painting with iodine or mercurochrome, the suspected area is isolated by sterile towels and an incision about an inch long is made, mainly with the point of the knife, deeply into the breast tissue of the suspected area. The knife must go right through the subcutaneous fat and well into the breast tissue, which can be recognized by its more fibrous and resistant quality. The knife is not removed from the incision, but is used as a guide to introduce a pair of toothed dissecting forceps which seize one edge of the incision in the breast tissue deep down in the wound. Traction is now made on the forceps by lifting it up towards the surface and, without removing the knife, cutting is resumed. The knife is carried in a circle round the point of the forceps and the forceps comes away with a wedge-shaped piece of breast tissue. While this is being examined by the pathologist the cavity of the wound is washed out with 1 in 1,000 perchloride of mercury to coagulate any loose epithelial cells. A single deep suture may be inserted in the breast tissue to approximate the sides of the small cavity in it and to arrest haemorrhage. The wound is then closed.

It is a common fault to make too long an incision for a biopsy. The smaller the incision the better, provided an adequate piece of breast substance can be reached.

Though, as an ideal, immediate radical operation, with a fresh set of towels, instruments, gloves, and swabs, should follow a pathological report of carcinoma, this is not absolutely essential. If the services of a pathologist skilled in the interpretation of frozen sections are not to be had the biopsy specimen may be sent away to a laboratory for a paraffin section and further operation deferred until the report is received.

It was formerly believed on Bloodgood's authority that this more leisurely procedure would seriously increase the risks of recurrence if carcinoma were found to be present. There would appear to be no sufficient ground for this belief; nevertheless the interval between exploration and radical removal should not exceed a week.

THE PECKHAM HEALTH CENTRE

A Three-years Survey

The words "annual report" on the face of a document induce a sinking feeling in the heart of a reviewer, and generally the more worthy the organization the greater the depression. But about the Pioneer Health Centre at Peckham, whose "annual" report dealing with three years' work has now been issued, there is something indefinably different. There is something different about the place itself, about the 600 to 1,000 people who go there every day, about the people in the gymnasium and the swimming pool. The visitor feels at once the atmosphere of social health. Moreover, many of these people suggest that they have got rid of some incubus, have found some new vitality, have released some hidden spring. Partly it is to be explained by the fact that they and their families have had a health overhaul, during which many of those minor maladies, not considered important enough to go to a doctor about, but nevertheless a drag on the wheels of life, have been discovered. They have been told what is wrong with them as a first step to getting it right. They are not treated at the Centre. The two medical directors and the medical consulting staff regard themselves as health advisers; their province is to examine and warn, but to concentrate on health and not on sickness, and not to duplicate the treatment services already provided. Up to

the middle of this year over 1,100 families had been examined, and in about 83 per cent. of the individuals something was found which needed treatment or correction—perhaps only a trivial ailment, or, it may be, the pre-clinical stage of some more serious malady, such as anaemia, hyperpiesis, or kidney disorder. One of the doctors remarked that among the women she examined when they first came to the Centre only about two were really fit, but on a second overhaul the vast majority had improved physically to a marked degree. The result is best described in the mechanical analogy adopted in the report itself—the feel of a motor car after decarbonization, adjustment of valves, setting of the jet, clearing the sump and renewing the oil, greasing the springs, taking up the slack in the steering gear, and adjusting the brakes. And, not least, refurbishing the coach-work!

That stimulating pamphlet *Biologists in Search of Material*, reviewed recently in these columns, was in effect the scientific report of the work of the Centre. But the Centre ranges over the whole field of living. It has given the opportunity to a section of London suburban population—perhaps the loneliest, least communal society in the country—to find social opportunities, companionship, and an outlet for unexpected faculties. For example, 157 married women, most of them middle-aged and astonished at their own achievement, have learned to swim. The value of it all is to be measured not in the pleasant glass-fronted building off a Peckham side street but in some hundreds of surrounding homes. The interest of the Centre in the family, which is its unit, begins while the family is still prospective. Young people about to marry are given a complete overhaul and a pre-marital consultation. When motherhood is expected particular attention is given to ensure as rich as possible an intra-uterine environment for the coming child. A number of women who had decided to have no more children are said to have changed their minds with the new outlook on maternal and family vitality which at the Centre no one can avoid, but have gone through their pregnancy not only with courage but with enjoyment. Provision for their confinement is arranged, if necessary, at local hospitals, and when they return to the Centre they are built up and instructed and looked after. The Centre is aiming at a membership of 2,000 families, but in the early years this remarkable sociological experiment depends on as much generous outside help as can be afforded to keep it going on an expenditure of £7,000 a year.

POST-CERTIFICATE TRAINING FOR MIDWIVES

One of the most useful provisions of the Midwives Act (1936) was that which gave the Central Midwives Board the power, not hitherto possessed by it, to require midwives whose names appeared on the Roll to take refresher courses from time to time. With welcome promptitude the Board proceeded to exercise these powers, and in April, 1938, it issued regulations requiring all midwives, with a few specified exceptions, as from January 1, 1939, to take a refresher course at intervals not exceeding seven years. It was laid down that these refresher courses should be of one month's duration, and should be residential, the student devoting the whole of her time to the work. The Act further provided that it should be an obligation of "every authority"—that is, every Local Supervising Authority—to provide, or to arrange for the provision of, these courses of instruction for the midwives practising in its area. At the time the Act of 1936 was passed facilities for the post-certificate training of practising midwives were non-existent over the greater part of the country, and even in London they were quite inadequate to provide for the large numbers who would become subject to the new requirements. Up to the present the Local Supervising Authorities have given little indication of an intention to establish centres at which post-certificate training could be given, either to their own salaried midwives or to those in the service of numerous voluntary nursing associations which are participating in the national service of salaried midwives.

The St. John's School in Poplar

It is therefore a satisfaction to record the establishment of a new post-certificate school in Poplar by the Nursing Sisters of St. John, which was opened by Sir George Newman on October 31 last. St. John's is a voluntary nursing organization which has been working in the east and south of London for exactly ninety years, and has, since the beginning of the present year, been responsible, under contract with the L.C.C., for the domiciliary midwifery of the whole of the Metropolitan Borough of Poplar. It is the intention of St. John's to reserve the whole of this area for the purpose of post-certificate training. Until a few months ago St. John's was associated with the General Lying-in Hospital in the conduct of the well-known Camberwell School for refresher courses, and it therefore brings considerable experience to the new centre.

St. John's Post-certificate School for Midwives is situated in the East India Dock Road, in the heart of a large industrial population. Study-bedrooms are provided for ten resident pupils; the services of well-known obstetricians as lecturers have been secured, and instruction will be given in the ante-natal clinics of three neighbouring hospitals through the most valuable co-operation of the L.C.C. and of the Royal College of St. Katharine. The large number of domiciliary cases which are available will allow of direct personal supervision of the pupils while actually engaged in the conduct of a confinement and in the management of the puerperium. This is a feature to which great importance is attached by St. John's, who hold that the full benefit of refresher courses cannot be obtained except through personal contact between teacher and pupil, and by supervision of the pupil when actually performing the duties of a midwife.

This effort of a voluntary organization to show how the new requirements of Parliament and the Central Midwives Board can best be met deserves recognition and welcome. Post-certificate teaching, organized in the manner proposed by the new school, should do much to maintain the efficiency of an important branch of the maternity service.

Reports of Societies

RECTAL REACTIONS FOLLOWING IRRADIATION OF CERVIX

At a meeting of the North of England Obstetrical and Gynaecological Society in Manchester on October 14 Mr. T. F. TODD (Manchester) read a paper on rectal ulceration following irradiation treatment of carcinoma of the cervix.

Mr. Todd discussed the incidence, pathology, and treatment of rectal reactions following irradiation. His material was studied at the Christie Hospital and Holt Radium Institute during the tenure of a research fellowship. Interest was aroused because these reactions were so often not recognized; several cases were referred after previous radium treatment elsewhere for further radiation of a reaction misdiagnosed as a rectal carcinoma. The literature was very scanty; such reactions had seldom been reported and nowhere was the pathology described.

Rectal reactions might be early, as acute proctitis, or late, as chronic ulcers with a distinct resemblance to rectal cancers; thirty-four chronic rectal reactions had been seen in approximately 800 treated cases. Morphologically chronic rectal reactions assumed one of two types. The first was a lesion restricted to the anterior rectal wall,

usually at the level of the cervix uteri, and forming a mobile ulcerated mass, some 3 to 5 cm. in diameter, resembling an operable carcinoma. The second consisted of a rectal ulceration similarly situated, but accompanied by gross perirectal induration, and the formation of a hard fixed mass enveloping the rectum, anchoring it to the sacrum, and resembling advanced inoperable cancer with an extensive extrarectal spread.

Symptoms and Aetiology

The onset was usually six to nine months after treatment. The symptoms included tenesmus, melaena, and often severe pain. The prognosis varied with the severity and type of the reaction. Spontaneous healing was the rule, but stenosis might occur and require colostomy. The aetiology of the condition was discussed in detail. Two factors were proven: that of local accidental overdosage, as happened when the radium applicators slipped and were approximated to the rectum in the posterior fornix; and that of retroversion, which allowed the intrauterine applicator to project against the rectum. Mr. Todd considered that the main aetiological factor was obliteration of the blood vessels in the posterior segment of the pelvis as a result of general high dosage. In one case coming to necropsy (the only one recorded) the rectal ulceration was shown to be due to mucosal necrosis. A perirectal mass was present and was composed of avascular fibrous tissue showing widespread vascular occlusion and histologically marked endarteritic changes.

The treatment of chronic reactions and their complications was described. Presacral neurectomy was done in four cases for the relief of pain and the acceleration of healing; the rationale of this operation was discussed. The incidence of rectal reactions could be minimized by preventing any misplacement of vaginal applicators, nursing patients in the prone position, and avoiding overdosage. Presacral sympathectomy might be a prophylactic against massive perirectal fibrosis by reason of its vasodilator effect.

Unusual Cases

Professor DANIEL DOUGAL (Manchester) described a case of adrenal virilism. The patient was aged 49 and was referred to Professor Dougal by a radiological colleague who had been treating her for facial hirsuties. The undue growth of hair first appeared two months after the cessation of the menses. The patient's general condition was poor. The liver was enlarged. A laparotomy disclosed the presence of an adrenal tumour with multiple visceral metastases, and she died forty-eight hours later. The primary tumour proved to be a highly malignant tumour of the right suprarenal gland. The lungs were filled with secondary deposits, although these had been quite symptomless.

Professor MILES H. PHILLIPS (Sheffield) described a case of acute prolapse of the urethra. The condition occurred in a doctor's wife, aged 70 or more, who had had for many years a procidentia, for which she had refused all treatment other than a pessary. At no time had she had any urinary symptoms. She suddenly noticed a little blood on her clothes shortly after micturition. An examination disclosed a dusky-red elongated and almost insensitive swelling over one inch in length protruding from the vestibule, with the tell-tale orifice at its apex disclosing its true nature. The prolapse was easily dealt with by excision and suture, and she recovered completely. This was the fourth case of acute prolapse Professor Phillips had seen. He was surprised to find that no such case had been recorded in the *Transactions of the London Obstetrical Society* or in the *Proceedings of the Royal Society of Medicine* between 1859 and 1938. Possibly this was because the condition had not been thought worthy of record. On the other hand, this would be the thirteenth such case reported to the North of England Obstetrical and Gynaecological Society. It would appear that urethral prolapse occurred in either young children or old women. Excision always effected a cure, although the late Professor Leith Murray recorded four cases which were successfully treated by digital replacement after the application of adrenaline.

Dr. MARY EVANS (Manchester) described a case of spontaneous rupture of the uterus. The patient had been delivered of her first child by craniotomy. She was well in her second pregnancy until the eighth month, when she came into labour prematurely, and after a labour of six hours was delivered normally of a living male child. Two hours after delivery she suddenly collapsed; the placenta was still retained and shoulder pain was very severe. Laparotomy disclosed a haemoperitoneum and a small rupture of the fundus. A total hysterectomy was performed, and showed an irregularly shaped placenta still *in situ* with a rupture of the uterine wall in the placental site.

Dr. J. W. BRIDE (Manchester) showed a specimen of a malignant melanoma of the left labium minus with secondary deposits in the inguinal glands. In view of the patient's age and poor condition radical treatment was impracticable, and all that could be done was a wide vulvectomy with removal of the larger glands. Dr. Bride then discussed a case of adenocarcinoma of the body of the uterus. The patient had had 110 mgm. of radium inserted for twenty-two hours four years ago on account of post-menopausal bleeding for which no cause could be found. The uterus was very much more enlarged than was usually the case in carcinoma corporis, and the cavity was very distended. Dr. Bride considered it unlikely that the growth was present four and a half years ago, and was of the opinion that the malignant change was probably due to the irritation of secretions retained in the uterus as a result of stenosis of the cervix following the radium treatment.

EXPERIMENTAL ASPECTS OF STREPTOCOCCAL INFECTION

At a meeting of the Aberdeen Medico-Chirurgical Society on November 3, with the president, Dr. H. E. SMITH, in the chair, Dr. JAMES HOWIE read a paper on some experimental aspects of streptococcal infection.

Dr. Howie emphasized that experimental streptococcal infections in laboratory animals, especially in mice, were of two varieties: either a trifling local lesion appeared, which rapidly resolved, or else the animal was overwhelmed by a septicaemic infection without any local tissue reaction at the point at which the organisms were injected. In man, on the other hand, while rapid invasion of the blood stream occurred in very virulent infections, this event was normally either averted or much delayed by a well-marked local tissue reaction. It was decided to attempt to produce in mice a streptococcal infection presenting the main characters of the human disease. To this end attempts were made to reduce the virulence for mice of a well-known laboratory organism—Aronson's streptococcus. This was a capsulated streptococcus of great virulence and stability; minute doses of culture, containing four or five organisms, regularly killed mice in twenty-four to forty-eight hours. This degree of virulence was associated with smooth colonies and with short-chained capsular forms.

Rough Variant of Aronson's Streptococcus

The organism was with difficulty induced to grow in media containing a concentration of 1 in 25,000 acriflavine. This concentration of the antiseptic was equal to forty times the maximum amount which normally permitted growth. Under these conditions the organism underwent rough variation and produced long-chained forms without capsules. In this condition it became entirely avirulent for mice; $\frac{1}{2}$ c.cm. of undiluted culture, containing 2,500 million organisms, was without effect. Virulence had been abolished rather than merely diminished. Kept under ordinary conditions this rough variant reverted gradually to the original form. In the phase of partial reversion its virulence was examined. Here it was found that the individual animal played the leading part

in determining the result; either the animal was overwhelmed by a streptococcal septicaemia or it remained indifferent to the injection of organisms. This method of approach to the problem, therefore, did not achieve the desired result, but it showed: (1) that antiseptics may abolish virulence in bacteria without actually killing them; and (2) the remarkable stability of virulence of Aronson's streptococcus—a biological phenomenon the reverse of that exhibited by ordinary strains of streptococci.

The next approach to the problem was made along the lines of work recently reported by Gay and his colleagues in America. Without discussing their experiments or conclusions in detail, it might be said that their belief was that macrophages were more important cells in tissue defence than were polymorphonuclear leucocytes. Workers in this country—notably McLeod—had criticized their contentions on the ground that they were testing the resistance to infection not of the body as a whole but of an area of granulation tissue which was able mechanically to exclude invasive organisms. Using Gay's technique extensive macrophage infiltrations were produced in the abdominal walls, omental sacs, and peritoneal cavities of mice. Virulent streptococci isolated from human lesions were injected intraperitoneally into these mice and into an equal number of normal controls. All the controls died in from twenty-four to forty-eight hours with an overwhelming septicaemia. In about half the experimental animals the fatal issue was delayed for from three to five days, but it was never averted. In only two animals did "abscesses" form in the peritoneal cavity. On section these "abscesses" presented appearances which supported McLeod's view that there was merely mechanical obstruction to the invading agent and not an enhanced resistance in any true sense. It was evident that this approach to the problem would not yield the results desired and other methods were investigated.

Mechanism of Infection

One method which was in some ways successful, Dr. Howie continued, and which yielded results of interest, was by the production of areas of "sterile inflammation" by calcium chloride. Virulent streptococci isolated from human lesions were injected into the peritoneum in mice with "calcium chloride inflammation" of their abdominal walls. Eighteen normal controls were also injected. All the controls died in from twenty-four to forty-eight hours; six of the experimental animals survived, and the rest died at times varying from two to sixteen days after injection. The mechanism of infection was studied. Streptococci rapidly entered the blood from the peritoneal cavity. In twenty-four hours they had localized in large numbers at the site of "calcium chloride inflammation." Here they produced well-marked abscesses and areas of cellulitis almost identical with those found in human infection. Reinfection of the blood stream occurred before death, presumably from these abscesses. The lesions produced were, on an average, about 20 by 15 mm., compared with lesions of about 5 by 3 mm. produced by streptococci alone. These areas thus behaved as "fixation abscesses," and apparently saved the lives of one-third of the animals injected, besides delaying the progress of infection in the others.

Conclusions and Clinical Applications

From these experiments, Dr. Howie said that three conclusions might be drawn: (1) organisms in the blood might localize in areas of reacting tissue; (2) this occurrence might favour the host's chance of survival, as in the experiments quoted; or (3) on the other hand, it might determine a severe and even fatal infection. It was, of course, dangerous and controversial to apply these experimental conclusions to clinical practice, but two questions seemed to arise. First, why would surgeons in this country not investigate the fixation abscess as a therapeutic measure in pyogenic infections not responding to other forms of treatment? There was need for such investigation. Many French authors wrote favourably of the method, but more exact data were required than were given in the literature. Secondly, it was now known that bacteriaemia was commoner than was formerly believed. Therefore, was it not probable in many of the *Cl. welchii* infections following operation, or even subcutaneous injection, that it was the patient who infected himself? The nurse or the catgut was usually blamed. But these experiments showing how organisms localized in areas of tissue reaction suggested that a similar mechanism might operate in human cases.

Local News

ENGLAND AND WALES

Croydon Epidemic of Typhoid

In the introduction to his annual report for 1937 as medical officer of health for the county borough of Croydon, Dr. Oscar M. Holden makes the following reference to the local epidemic of enteric fever:

"The health record of the year was unfortunately marred by an outbreak of typhoid fever in parts of Croydon supplied by the high-level water supply. A full report on the outbreak will be made at a later date. This outbreak, though not so excessive as an outbreak in another southern town in 1936, obtained very great publicity. Upon representations made by a group of citizens, who formed the South Croydon Typhoid Outbreak Committee, the Minister of Health decided to hold a public inquiry into the causes giving rise to, and the steps taken to combat, the outbreak. This inquiry is the first of its kind to be held. It opened on December 6, when an adjournment was made until December 21, from which date it continued until January 12, 1938. The holding of so comprehensive an inquiry, for which much detailed information had to be compiled, and at which many criticisms had to be met and combated, during the actual course of a serious outbreak of epidemic disease, placed heavy additional burdens upon the department, already working at high pressure to deal with the outbreak. It says much for the energy and loyalty of the staff of the department that both burdens were shouldered successfully. The findings of the Commissioner are now too well known to need any reiteration, but it is justifiable to inquire, first, if the inquiry could have been held just as usefully after the outbreak had been dealt with; and, secondly, if the findings could not have been arrived at as efficiently and more expeditiously by methods of a less elaborate and costly nature. If this procedure is to form a precedent, then medical officers of health will in future, when called upon to tackle an outbreak of epidemic disease, also have to take steps to protect themselves at the public inquiry held thereinto."

Child Guidance Conference

A preliminary programme has now been issued for the fourth Biennial Child Guidance Interclinic Conference to be held on Friday, January 27, and Saturday, January 28, 1939, at British Medical Association House, Tavistock Square, London, W.C. This conference is for representatives and professional members of staffs of child guidance clinics in Great Britain. On January 27, at 10 a.m., the president, Lord Blanesburgh, will give an opening address in the Great Hall, followed by a session on "Treatment of Parents." In the afternoon there will be a public meeting on "Juvenile Delinquency" under the chairmanship of Lord Alness; members of the public may be admitted to this by ticket, price 2s. 6d. The conference dinner will take place at the Café Royal that evening. On January 28 there will be three concurrent morning sessions: one for psychiatrists in the Council Chamber to discuss personality deviations and the diagnosis of psychoses, one for administrative representatives in the Hastings Hall to discuss the findings of the Feversham

Report on the voluntary mental health services, and one for psychologists in Committee Room A to discuss the scope of the educational psychologist working in the schools. The afternoon session in the Great Hall will be devoted to a discussion on "Substitute Homes." Inquiries about the conference should be addressed to the Child Guidance Council, Woburn House, Upper Woburn Place, W.C.1.

Kettle Memorial Lecture

In May, 1937, an appeal was issued to friends and admirers of the late Professor E. H. Kettle, M.D., F.R.S., for subscriptions towards a memorial fund. More than £730 was received; this has been invested and a trust fund set up, with Professor J. H. Dible, Dr. W. E. Gye, Professor G. Hadfield, Professor W. D. Newcomb, and Colonel A. H. Proctor as trustees. It was decided that the best way of commemorating Professor Kettle would be by an annual lecture to be delivered in rotation in the medical schools with which he had been associated—namely, the British Postgraduate Medical School, St. Bartholomew's Hospital Medical College, the Welsh National School of Medicine, and St. Mary's Hospital Medical School. It was further decided that the choice of lecturers and arrangements for the lecture in any year should be made by the school at which the lecture would be delivered. The inaugural lecture will be given on Thursday, November 24, at 5 p.m., by Professor W. W. C. Topley, M.D., F.R.S., in the large theatre of the London School of Hygiene and Tropical Medicine, Keppel Street, W.C., by courtesy of the Board of Management. It is entitled "The Place of Pathology among the Medical Sciences," and the chair will be taken by Sir John Caulcutt, K.C.M.G., chairman of the Governing Body of the British Postgraduate Medical School.

Correspondence

Estimation of Blood Vitamin B_1

SIR,—I have read the paper by Drs. Eirwyn N. Rowlands and John F. Wilkinson in the *Journal* of October 29 (p. 878) with interest because I have just submitted for publication a paper in which I conclude that Meiklejohn's modification of Schopfer's method does not give a quantitative estimate of the vitamin B_1 in blood.

Rowlands and Wilkinson state that they have established the fact that the test gives a fairly reliable method of estimating the vitamin B_1 in blood. They say: "The only factor other than vitamin B_1 that has been shown to affect the mould growth is the concentration of nitrogen in the medium; allowance can be made for this." I should be interested to know how this allowance can be made when blood is present, because I have had difficulty in eliminating the adjuvant action of sources of nitrogen in blood. In addition, the first part of this statement is open to criticism. First, substances other than vitamin B_1 and its disintegration products are known to act as growth factors for the fungus. Secondly, a host of substances are known to affect its growth; for instance, if the authors will add a pinch of chalk to their modified Schopfer's medium (which is in many respects a poor medium) they will obtain, I suspect, an increase of perhaps 50 per cent. in the growth produced by either 0.1 μg. or excess vitamin B_1. They state (perhaps following Meiklejohn) that addition of small amounts of vitamin B_1 to blood *usually* increases the growth by the expected amount. I should be interested to know how often this result has been obtained, because I found that in 150 1-ml. samples of blood from different cases addition of 0.1 μg. of vitamin B_1 produced an increase of 50 per cent. or more over the expected amount in 63 per cent. of cases; in fifty experiments addition of excess vitamin B_1 to 1 ml. of blood invariably produced a greater growth than in the control with excess vitamin B_1 alone (the average increase being 78 per cent.). They also state (perhaps again following Meiklejohn) that samples of 1, 2, and 3 ml. of blood give values in the ratio 1:2:3. I have tested this upon 235 different samples of human blood and find that in 155 the 3 ml. value (expressed in μg. per 100 ml. blood) has been one or more μg. higher than the 1 ml. value; in twenty-two samples the growth with 3 ml. of blood was greater than that given by excess vitamin.

My own doubts about the reliability of the test have been expressed only verbally in the presence of both authors; they are no doubt justified in disregarding them. But there can be no justification for ignoring statements of other authors that are not in agreement with them. Williams, who first suggested the use of a micro-organism for the assay of vitamin B, has stated in connexion with *Phycomyces* that "the use of fungi in quantitative testing for vitamin B_1 in extracts appears hazardous in the extreme." Van Veen in a Dutch journal concluded that in testing impure extracts (including blood) by Schopfer's method "the results were far from reliable; in fact, that they were at times entirely unserviceable." Schopfer himself has stated that the best way to use the method is first to isolate the vitamin by adsorption on fullers' earth. These statements demand attention.

With great diffidence I communicated last June (see *Quart. J. Med.*, October, 1938, **7**, 591) the results of estimations by a slightly modified method of the apparent vitamin B_1 in only 200 different cases. I found significantly low values in cases of "alcoholic" (three cases), gastrogenous, and nutritional polyneuritis; in some cases of idiopathic hypochromic anaemia; and in scurvy. I found normal values in pernicious anaemia with or without subacute combined degeneration of the cord. My results were not published in print because I had then done determinations on only twenty-six normal controls; these gave a mean of 11.5 μg. per 100 ml., and a statistical analysis showed that there is one chance in 100 of an observation falling below 7.7 or above 15.2. Although the authors have reached the same conclusion about different diseases from their total of forty-eight cases, it is not justified by the results they publish. On the basis of only eight normal controls they consider the normal range to be 6.5 to 16.5 μg. per 100 ml.; a statistical analysis of their data will show that there is one chance in twenty that a determination will fall below 0.94 or above 16.5. Not a single one of their determinations is significantly low when judged by these standards, and yet they regard 5.5 μg. per 100 ml. as "gross deficiency." This figure, 5.5, is scarcely different from their lowest normal, 6.5, since "the error of the test is apparently less than 10 per cent." Further, in Fig. 3 they show two "specimen normal curves" in which the blood figures, after the injection of vitamin B_1, rise before falling rapidly "to normal levels" within an hour; in one of these two normal curves the level starts at a little over 5μg. per 100 ml. (about 5.2) and is back at the same figure in two hours. Surely a mistake has crept in, because if 5.5 is "gross deficiency," why is 5.2 regarded as a "normal level"?

There are other points that I should like to raise, but I have already taken up too much of your valuable space. I do wish to emphasize, however, that the results Drs. Rowlands and Wilkinson publish are statistically worthless. —I am, etc.,

Oxford, Oct. 29. H. M. SINCLAIR.

Medical Research in England

SIR,—The Harveian Oration prompts me to make a few comments on the difficulties and necessity of maintaining research work in the teaching hospitals.

After spending some seven months in German hospitals and university clinics I came away, like most English visitors, impressed by the intensity of their tradition of investigation. Good work is continually being turned out by young men of no outstanding abilities, and this all in the day's routine. Sir Edward Mellanby has touched on the organization that makes this possible. Our own teaching hospitals have no such strong tradition

and their organization is the very opposite of what is desirable for this sort of work. They are chiefly concerned with the practice of medicine and the education of good doctors. In this they excel. But their organization makes research work (other than purely clinical investigation) extremely difficult. The staff are chosen in most cases for their ability as doctors. Those who are appointed because of the original work they have done often find their careers as investigators automatically ended. On the other hand the younger men who have time and a fixed salary too often produce nothing. They lack "directors." It is abundantly clear that they cannot be expected to hit on useful and workable investigations; at any rate, in the long run they do not. In Germany they are not expected to—they are told what to do and how to do it. In England the seniors may give verbal encouragement, but they cannot set an example, and in most cases they have never themselves had the experience necessary to give advice.

Outside the teaching hospitals there are other places much better suited for this type of work. There are, of course, the special research institutes created for the purpose. Presumably they are as suitable as they can be made. There are also the large county council hospital systems, which are built on a plan very similar to the German model. They are comparatively affluent. They have a permanent salaried staff which is interchangeable with any hospital within the group. The superintendent has enough control to unify and co-ordinate the work. As yet they have made no use of these possibilities, and for this there are many good reasons. For one thing they have still less tradition of research than the teaching hospitals. But the most important is that there are not enough men in England with the right technical training and above all with the right habit of thought to seize these opportunities. The frame of mind that can deal satisfactorily with sick people is quite different from that which contributes to the science of medicine. We cultivate chiefly the former and the Germans the latter. But they are both susceptible of cultivation, and since we need more men with a scientific bent we must turn once again to the places where these trends are determined.

It is clear that whatever research institutions one may design the staff must be recruited from the students and housemen in the teaching hospitals. At the moment we depend on some idealists and a few who fear the more boisterous competition of practice. These may be very good, but they are not enough. If the average capable man is to be attracted to this work he must see it going on around him as often as he now sees good medicine, and he must have the opportunity of imitating it in the same way. The difficulties and fascinations of their own investigations must become as much "shop" in the common-room as are their triumphs and failures in medicine. It is useless from this point of view to create centres at Hampstead and Mill Hill. Their very prestige and success increase their remoteness when the student cannot see the first steps that lead there. Investigation, therefore, must be brought into the daily routine of the young man and held there despite all discouragement.

This organization must not be judged solely by the work it produces, for it will be continually hampered by the constant change of new recruits. It should be judged by the men it turns out, just as to-day the *raison d'être* of the teaching hospitals is not so much the quantity of medicine that is practised within their walls as the quality of the doctors they send throughout the land.—I am, etc.,

London, W.1, Nov. 6. J. B. Harman.

Congenital Deformities of Hands and Feet

Sir,—I have recently seen a girl aged 9 years suffering from a condition similar to that described by Mr. Henry Poston in the *Journal* of November 12 (p. 991). The radiographs of her hands are almost identical with those illustrating his case, and her mother's hands show a similar lesion, evidently healed and resulting in marked deformity of the fingers. Dr. Norah Walker drew my attention to the following references which deal with the condition: *Year Book of Radiology*, 1935, p. 60; and 1937, p. 56. Apparently the disease is fairly common in certain parts of East Russia (Transbaikalia), where it is called Urov, or Kashin-Bekov, or Kaschin-Beck disease. Its causation is unknown, but injury is unlikely to be responsible because the bone changes are usually widespread. This is well illustrated in the original paper by W. Graziansky (abstracted in the first of the references quoted above).

Through the kindness of Mr. C. Thurstan Holland and Dr. J. H. Mather I have seen radiographs of two other cases, both living in the Liverpool district.—I am, etc.,

Norman B. Capon, M.D., F.R.C.P.

Liverpool, Nov. 14.

Sir,—In the *Journal* of November 12 (p. 991) Mr. Henry Poston publishes an interesting example of epiphyseal deformity. This deformity usually involves the middle phalanx and leads to stunted development of the affected phalanges. It has been recorded in the middle phalanges of the second, third, and fourth fingers, and a few months ago Dr. Levi submitted radiographs to me of the same condition, with, in addition, changes at both extremities of the diaphysis of the first metacarpal.

It appears to be a congenital familial defect, for it has been noted in a father, three brothers, a sister, and in former paternal generations. All the cases recorded show the condition to be bilateral. It has been found in boys and girls ranging in age from 7½ to 19½ years. The lesion has been described in a number of journals by Thiemann, Esau, Ryffel, Boldero, Shore, and Weil.

The congenital deformities of the hands and feet observed by Mr. E. N. Callum are identical with the condition described by K. Pearson under the title "split foot or lobster claw" (descendants of "Cleppie Bells"). Lewis and Embleton considered 180 cases of "split foot," and point out that the hands, which have never been recorded as affected in the absence of a foot lesion, show one or two main types of deformity. Either it is analogous to the foot lesion, the defect falling mainly upon the centre of the hand, or it affects the pre-axial border of the hand. As a rule the phalanges of at least two or three digits are absent. In the presence of foot malformation one or both hands may escape entirely. The deformity of the hands described by Mr. Callum may occur without the split foot; I published an example of such a deformity in the *British Journal of Radiology* of April, 1936 (p. 265).—I am, etc.,

Birmingham, Nov. 14. James F. Brailsford.

Control of Small-pox in India: A Suggestion

Sir,—No one familiar with the small-pox mortality figures for British India will dispute that the measures hitherto taken to control small-pox in that country have signally failed. Year after year the ravages of the disease continue to be appalling. During 1936 the deaths from small-pox in Bengal numbered no fewer than 46,267, and in Calcutta alone there were 4,382 deaths. The amount

of sickness and suffering, not to mention the economic loss, which these figures represent is incalculable but can be imagined.

For many years the authorities have pushed vaccination as far as ever it was practicable to do so. I have seen it suggested (and I think it was in an official report) that vaccination would seem to be less effective in protecting the individual in a hot country like India than in temperate climes. However that may be, the effect of vaccination in protecting the community in India has obviously been a lamentable failure.

What a contrast with the state of affairs in our own country! Here the mortality from small-pox has been reduced practically to *nil* since the variety of small-pox known as variola minor came to this country and "took the place" of variola major. In the memorandum on small-pox recently issued by the Ministry of Health (Memo. 215, Med.) it is stated: "The years 1920–1 mark the virtual end of the incidence of variola major as a serious administrative problem, and the beginning of the rise of the minor variety to epidemic proportions."

Now my suggestion is this: that the authorities in India should deliberately introduce and encourage the spread of variola minor in India. This could be done by substituting inoculation with the virus of variola minor for vaccination with calf vaccine. There should be no insuperable practical difficulty. Special legislation might be necessary, and it would probably be wiser to call for volunteers rather than resort to compulsion. Each case inoculated would probably give rise to several other cases, and these in turn would "hand on the torch" to others. There would be no real risk attaching to the experiment, for clinically variola minor is little, if at all, more serious than vaccination. The protection conferred by variola minor against variola major is probably as great as, if not greater than, that conferred by vaccination. The great difference is that the one is infectious while the other is not, and herein would lie the great advantage of variola minor over vaccination in a country like India. Provided the disease could be persuaded to establish itself there is good reason to think that it might oust variola major. If the experiment failed no harm would have been done, while if it succeeded it might be the means of saving countless lives and untold suffering. —I am, etc.,

Leicester, Nov. 11. C. KILLICK MILLARD.

Decline of Breast-feeding

SIR,—When Dr. Ronald Carter (*Journal*, November 12, p. 1013) states that breast-feeding is the best possible method of infant feeding, his opinion would be accepted in respect of a large number of cases. But the doctor in general practice knows that this does not apply to a considerable proportion of the patients whom he has to deal with. There are patients who, in spite of every encouragement, supplementary feeding, and all the other usually employed devices, prove themselves beyond any doubt incapable of supplying in the natural way any useful contribution to the baby's daily needs. One may speculate on why this should be so. Modern conditions, unsuitable environment, or lack of vitamins in the mother's diet may all have something to do with it. With regard to the last-mentioned possible cause, Dr. Carter says that "there is no shred of evidence to support this hypothesis," but in the leading article on food and nutrition in the *Journal* of October 29 (p. 895) it is pointed out in regard to the working classes that "practically all its members fall very considerably short in their intake of . . . vitamins."

If the infant normally obtains its supply of vitamins, pre-natally and post-natally, from its mother, and if it be agreed that a serious diminution of vitamins may account for a lessened vitality of the infant, is it unreasonable to suggest this as a cause for the failure of many infants to thrive under modern conditions? So long as routine advice to continue breast-feeding is given to every mother, so long will there be delay in many cases before those responsible bow to the inevitable and permit the long-suffering infant to receive adequate nourishment from another source.—I am, etc.,

HORACE A. NATHAN,
Honorary Secretary.

Kensington Division, British Medical Association, Nov. 12.

SIR,—The recent correspondence in the *Journal* has proved of great interest to me, but I have refrained from contributing to it in the hope that some expert in milk production would give the benefit of his experience.

Some years ago I was greatly concerned with the difficulties which many women appear to have in feeding their infants in the way that Nature intended they should be fed. I read most of the medical authorities on the subject, but my results continued to be bad, though I carefully carried out their instructions. Thoroughly discouraged as I was, I felt inclined to subscribe to the belief that civilization and the mental make-up of the "modern mother" were inimical to breast-milk production, but I then consulted the real experts on milk production—the dairy farmers—whose living depends upon the mammary output of their cows. Practical knowledge of milk production is possessed by thousands of dairy farmers, and we ought not to allow prejudice or pride prevent us from going to them for information and instruction. The farmer knows well that the cow requires a daily ration of food adequate to maintain health and working capacity. This is known as the maintenance ration; but he gives in addition a milk-producing ration calculated at so many pounds of food per day per gallon of milk yield. This addition to the maintenance ration has a high protein content, for protein is one of the keys to milk production.

A pint of human milk contains about 12 grammes of protein, and this protein can only be obtained from one source—namely, the protein in the mother's diet. The human body is not a perfect biochemical factory and requires approximately 24 grammes of protein intake for an output of 12 grammes of milk protein. Much of the 24 grammes should consist of protein of high biological value. The study of family budgets of unemployed and lowly paid families makes it abundantly clear that many women are unable to purchase even a minimum adequate protein maintenance ration. Is there any wonder, therefore, that they are unable to spare sufficient protein for milk production?

Realization of the basal fact that the woman's diet must contain adequate quantities of protein and the other materials (calcium, etc.) necessary for the manufacture of milk solved the problem of breast-feeding. Very few women on an adequate milk-producing ration fail to feed their infants at the breast, and the disinclination and aversion to doing so change rapidly, when the diet is properly adjusted, to a contented pleasure in the performance of a natural duty towards their offspring.—I am, etc.,

Stockton-on-Tees, Nov. 14. G. C. M. M'GONIGLE, M.D.

Prevention of Breast Infection

Sir,—I have read with great interest Mr. Charles Donald's article on acute infections of the breast (*Journal*, November 5, p. 954). In it he states that the nipple should be washed with warm boric solution immediately before the child is put to the breast. I would suggest that it would be advisable to wash the nipple free from boric solution, with sterile water, before feeding the baby.—I am, etc.,

Dublin, Nov. 9. Robert M. Corbet.

Prognosis of Anxiety States

Sir,—Dr. Frederick Dillon (*Journal*, November 12, p. 1014) is no doubt very adept at reading the unconscious mind, but I feel that he should refrain from attributing to me opinions concerning the value of treatment in anxiety states which I have never expressed and do not hold. It appears to me that the treatment given is only one of the factors of prognostic significance in anxiety states, and not necessarily the most important—a very different thing from saying that it is of no importance whatever. Dr. Dillon's argument seems to be that one is not in a position to draw conclusions about any of these factors unless one can estimate them all—a view that would invalidate practically every prognostic criterion in medicine and surgery. For example, if one were studying the effect of age on the mortality of pneumonia, one's findings would be of no value unless one also obtained details of the types of pneumococci, methods of treatment including nursing, race and physique of the patients, state of nutrition, and so on *ad infinitum*. If one could assess every factor in a case accurately one could be certain of one's prognosis, but it is a commonplace that this ideal state of affairs is rarely attained. Nevertheless, we venture an opinion in most cases.

In my paper I tried only to express views which were supported by facts ascertained by the inquiry, and will repeat that no reliable conclusions concerning the value of treatment could be deduced from the data at my disposal. All the patients received some psychotherapy, even if only the reassurance accompanying the history-taking at the preliminary interview, but prolonged analysis was only given in three cases.—I am, etc.,

London, W.1, Nov. 12. Arthur Harris.

Sulphonamide Chemotherapy in Surgical Infections

Sir,—In his articles on sulphonamide chemotherapy in surgical infections (*Journal*, October 22, p. 845; October 29, p. 901) Mr. A. J. Cokkinis emphasizes the need for waiting for "immunity" to develop before therapy is begun in gonococcal infections, does not advocate such a delay in streptococcal infections of the hand, and ignores the fact in other infections. It would appear necessary to know the time taken for "immunity" to develop in certain cases, and it would be interesting to learn how this is estimated. I have used the sulphonamide group of drugs extensively, but unfortunately without elaborate laboratory control. Therapy was started immediately upon admission or as soon as indicated. In approximately 200 cases of diagnosed gonorrhoea in the female various preparations and dosages were employed. In nearly 90 per cent. of the cases the discharge either ceased or was apparently free from the gonococcus in three weeks. Proseptasine was eventually standardized with the following dosage:

Four tablets four-hourly for four days (32 grammes); then three tablets three times a day for three days (13.5 grammes); then one tablet three times a day for eight days (12 grammes). This gives a total dosage of 57.5 grammes.

Practically every case, whatever the preparation or dosage, developed some toxic manifestations, however slight, such as nausea, vertigo, headache, epistaxis, ulnar paraesthesiae, and in one or two cases a heliotrope coloration. One pregnant woman inadvertently received a full dose of magnesium sulphate and developed a deep heliotrope coloration within twenty-four hours. This persisted without any other sign or symptom for some days until her uneventful delivery. It is impossible to categorize relapses, as most of them were probably re-infections. Two cases of gonococcal vaginitis in children aged 9 and 11 did not respond. Cases of streptococcal tonsillitis received one tablet of proseptasine to suck four-hourly upon admission, and recovered rapidly. No response was noted in a number of cases of infective polyarthritis or after the external application of powder or solution to cases of impetiginous infections.—I am, etc.,

Albrighton, Nov. 7. Frank R. Neubert.

The Occipito-posterior Case

Sir,—When teaching students concerning the use and abuse of obstetric forceps one has usually stressed certain provisos—among others that the occiput must be in an anterior position, the os fully dilated, and the uterus contracting. Dr. David Price (*Journal*, September 17, p. 638), using his reversible pelvic curve forceps, seems to be a law unto himself in this matter. He is apparently quite happy to apply forceps to a head in any position, with os incompletely dilated and in the absence of "pains." When gently rebuked by Dr. B. E. Meek (October 29, p. 919) he shows no sign of penitence, but even appears to revel in his sins (November 5, p. 968). He even goes so far as to state his belief that application of forceps without full dilatation will be a cardinal procedure to the obstetrician of the future.

Why interfere at all? Why not give Nature a chance? She will often succeed where man has failed—and did so in fifty-eight out of 314 cases of "failed forceps" sent into St. Mary's Hospitals, Manchester, during the last ten years. I suggest that the next time Dr. Price is tempted to interfere he should give the patient ¼ grain of morphine instead. The result might surprise him.

I have a second bone to pick with Dr. Price. I received the other day from a firm of instrument makers a leaflet advertising a "reversible pelvic curve forceps with jointed pelvic blades designed by Dr. David Price." The forceps is described in some detail and instructions are given as regards application. The last paragraph reads as follows:

> "When a large caput succedaneum has formed in a delayed second stage of labour the position of the occiput is not easily ascertained. If application of the forceps, followed by traction, produces no perceptible advance, press upwards and try rotation in the easiest direction. Rotation accomplished, if the occiput is now anterior, it will be found that advance is at once possible and, with the handles well carried forward, a rapid extraction can be made.
>
> "*If rotation is not easily accomplished or if, when rotation is accomplished, no advance still occurs, the position of the occiput must be diagnosed by insertion of the whole hand.*" [The italics are mine.]

Really, Dr. Price, this is going a little too far. In the first place, in my humble opinion, an instrument maker's advertisement is a most unsuitable medium for the

expression of one's views on obstetrics, particularly views so unorthodox as these. Secondly, it is surely a basic principle that diagnosis should precede treatment, and not vice versa.—I am, etc.,

Manchester, Nov. 8. E. A. GERRARD, M.D., M.C.O.G.

Air Raid Precautions

SIR,—I read with interest your leading article in the *Journal* of October 8 (p. 749) and the ensuing correspondence. Emptying hospitals, under instructions from the Ministry of Health, was surely right during the recent crisis, but the idea of treating casualties in vulnerable buildings showed extreme folly and complete ignorance of the effect of modern aerial warfare on present-day masonry. A study of the fighting in Spain and China goes to prove that the effects of incendiary or gas bombs are insignificant when compared with those of the heavy high-explosive variety.

Dr. Clement Francis (October 22, p. 862) undoubtedly, in my opinion, strikes the nail on the head. He says "it is useless to provide the most efficient medical service conceivable if the number of casualties is going to be tens of thousands, all occurring in the space of a few minutes." The chief aim should be to limit in every way the number of casualties. This can only be done by the provision, so far as possible and as soon as possible, of bomb-proof shelters for our civil population. Until some new method of dealing with bombing planes is found which will be so efficient as practically to preclude the risk of aerial bombardment entirely, provision of these shelters must be of paramount importance. Passive resistance to aerial warfare must, in a protracted struggle, be of almost as great importance as the possession of great powers of aerial offence. The fighting forces depend on adequate civil backing. Unless the civilian is trained to resist passively by safeguarding himself or herself, the fighting forces will suffer in efficiency and offensive power. All must serve in a time of national emergency, so the safety and efficiency of the individual is of prime import.

I agree with Dr. W. G. Booth (October 22, p. 862) that control of emergencies should be local, and think that it should be vested in the air raid wardens. Wardens should have prearranged parties ready to deal with gas, fire, or casualties caused by high explosives. While the medical profession must co-operate in all these services, it is mainly with casualties of the latter variety that we are concerned. Doctors and first-aid squads will, of course, be very necessary, but much more than that will be required. Many injured will be buried under fallen masonry, beams, joists, and even steel girders. Skilled artisans must be available who have technical knowledge of building construction—for example, masons, bricklayers, carpenters, and oxy-acetylene cutters—complete with tools, saws, pickaxes, crowbars, levers, ladders, etc., to release casualties buried in the debris of buildings. There must be rapid means of transport: for artisans and tools, lorries; for first-aid squads, motor ambulances. Casualties should be dealt with swiftly and temporarily and conveyed immediately to properly prepared hospitals.

Such hospitals should be bomb-proof even to direct hits. The present hospitals might easily be completely wrecked, with further suffering to the already wounded and the loss of important surgeons, doctors, and nursing staff. The medical services will be invaluable to the State in the event of war, and to do their best work they should be able to operate free from anxiety. These hospitals would be entirely of a surgical nature, and should be looked on as casualty clearing stations. Casualties must not remain in them for any length of time. As soon as possible they should be evacuated by motor convoy to large decentralized hospitals in wide rural areas where the risk of bombing would be slight compared with that in built-up places. Country mansions with a system of sandbagged hutments spread round would be excellent, as would shooting-lodges in Scotland.—I am, etc.,

Grantown-on-Spey, Oct. 24. D. M. MARR, M.D.

SIR,—It seems certain that unless an alternative scheme is put forward by an authoritative body wholesale billeting will be the method selected for evacuation of the civilian population in time of war. Although the nation is prepared to accept necessary evils, the people are entitled to ask whether a better alternative cannot be found, even if only for a proportion of the population. To be satisfactory—that is, efficient and economical—an evacuation scheme should: (1) make use of such collective grouping of the population as normally exists; (2) utilize existing buildings and other facilities; and (3) not require constant revision. Taking these points in order, it is obvious that the children attending national schools form groups which it would be desirable to maintain as units under the control of their own teachers. If they are distributed in twos and threes among the inhabitants of country districts supervision and general care must be haphazard, apart from the serious difficulties caused to the households receiving them. Refugee camps have been suggested, but in winter, at any rate, life under canvas, with its problems of water supply and sanitation, presents serious problems.

In many country districts there are large national school buildings which could be adapted as hostels. This would interfere with local education; but in many cases there are church halls which could be utilized as classrooms, failing which it would be easier to erect temporary wooden buildings for this purpose than for living accommodation, owing to the greater requirements of the latter in regard to sanitation and water supply. Billeting arrangements as at present suggested would need constant revision, as households vary from time to time in the number of inmates, and therefore in their billeting capacity, whereas the capacity of the national school buildings remains constant.

The scheme advocated would require a central district committee to select those schools most suitable as hostels, bearing in mind the need of facilities for an augmented food supply. Schools having been inspected and dormitory accommodation determined, the city school personnel (teachers and children) could be allocated according to numbers, dividing the sexes when the numbers are too large to be accommodated as one unit. Subcommittees would be required to deal with problems of equipment, provisioning, and transport; local committees should be formed to co-operate with these subcommittees. Additional staff would be needed, part of which could be recruited locally—for instance, cooks and cleaners. If the national school children were dealt with in this way children attending other day schools might be accommodated in those country houses which have been empty for years, and are likely to remain so, chiefly on account of their size. Youth hostels might house some of the older boys. The schools vacated in the cities would make admirable first-aid posts and clearing hospitals (apart from vulnerability), and could quickly be adapted for this purpose at short notice if each had been individually inspected and if plans had been drawn up for decontamination rooms, etc., and all materials assembled for gas-proofing.—I am, etc.,

Edinburgh, Nov. 8. ESMÉ HILL.

SIR,—I entirely agree with Mr. A. G. Dickens's letter in the *Journal* of November 5 (p. 965). I have advocated bomb-proof shelters from the first as the only basis for A.R.P., and I would like to urge the leaders of our profession to bring pressure on the Government to put through a scheme without delay and regardless of legitimate expense in London and other big towns. Medical men cannot possibly give adequate attention to casualties unless really safe bomb-proof shelters are provided for them and their patients. If sufficient accommodation is forthcoming for all those who are not likely to be evacuated the majority of casualties will be prevented and the threat of bombing will lose much of its terrors. Mr. Dickens has asked those who are interested to write to him at Keble College, Oxford, and I hope there will be a big response.—I am, etc.,

London, W.14, Nov. 7. C. WATNEY ROE.

Universities and Colleges

UNIVERSITY OF OXFORD

On November 7 Jean Orr-Ewing, B.M., was elected to an official Fellowship at Lady Margaret Hall.

UNIVERSITY OF CAMBRIDGE

On the nomination of the Faculty Board of Medicine Dr. A. N. Drury, F.R.S., Huddersfield lecturer in special pathology, has been appointed assessor to the Regius Professor of Physic for the year 1939.

UNIVERSITY OF LONDON

Sir Girling Ball, F.R.C.S., has been elected Dean of the Faculty of Medicine for the period 1938–40.

Sir Ernest Graham-Little, M.P., has been re-elected for the seventeenth consecutive year chairman of the Council for External Students of the University of London.

University College

A special University Lecture on "Intermolecular Forces and Infra-red Spectroscopy" will be given at University College, Gower Street, W.C., by Dr. Jacques Errera, professor of physical chemistry in the Université Libre de Bruxelles, on Monday, November 28, at 5.30 p.m. The chair will be taken by Sir Robert Robertson, F.R.S. The lecture, which will be delivered in English and illustrated with lantern slides, is addressed to students of the University and to others interested in the subject. Admission is free without ticket.

ROYAL COLLEGE OF SURGEONS OF ENGLAND

The Buckston Browne Dinner

The eleventh annual Buckston Browne dinner to Fellows and Members of the Royal College of Surgeons was held at the College on November 10, with the President, Mr. Hugh Lett, in the chair. Reviewing the activities of the College during the past year the President said the chief event had been the opening of the Bernhard Baron Research Laboratories. Experimental research had become an increasingly important part of the activities of the College during the last ten years. Six years ago it received a great stimulus by the magnificent gift and endowment by Sir Buckston Browne of the Research Farm at Downe, but the laboratories at the Royal College were unworthy of that great institution. Although the College did not know where the money might come from they hopefully drew up plans and prepared estimates of cost. Their hope was justified, for Sir Alfred Webb-Johnson conjured the splendid gift of £30,000 from the Bernhard Baron Trustees. Building was begun in January, 1937; the fourth and fifth floors were reconstructed, and a sixth floor added, and the new laboratories were opened by the Earl of Athlone last December. The excellence of the work that had been done at the Buckston Browne Farm and during the last eleven months in these laboratories must give much satisfaction to the generous donors. Most of the research had a direct bearing on surgical treatment, diagnosis, or pathology.

The College was grateful, Mr. Lett continued, for grants for its research workers from outside bodies, particularly the Medical Research Council, the Rockefeller Institute, and the British Medical Association. These grants were a source of much satisfaction, not only as a recognition and appreciation of the quality of the work that had been done and the facilities the College could offer, but as a tribute to the Director of Research and Professor of Experimental Surgery, Dr. John Beattie, who, well known for his original work in the field of physiology, was now recognized for his gifts in initiating and directing research. Good progress had been made in the Museum under the direction of the Pathological Curator, Dr. L. W. Proger, and the Assistant Conservator, Dr. A. J. E. Cave. Many valuable specimens had been added, particularly in the sections of osteology and pathology. The pathological work of the Radium Beam Therapy Research had been entrusted to the College, and the secretariat of the Imperial Cancer Research Fund had been transferred there. Mr. Lett acknowledged the College's gratitude to Mr. Braithwaite for securing the bust of Thomas Wormald, who was President in 1865, and to the Middlesex Hospital Medical School for the gift of a fine bust of John Whitaker Hulke, President from 1893 to 1894. In conclusion he referred to the need for cleaning and restoring the College's pictures. The recent alterations to the building and the increasing cost of the Museum and Research Departments had made it impossible to draw on general funds for the purpose, but Sir Alfred Webb-Johnson had put the College still further in his debt by announcing a gift of five hundred guineas from an anonymous donor.

Sir Buckston Browne, replying to the toast of his health, said that it had been his privilege to live through exactly the last half of the nineteenth century, that wonderful century which had done more for the alleviation of man's physical miseries than all previous centuries put together. With this achievement the names of Jenner, Pasteur, and Lister were immortally associated; they were the emancipators of the human body. But above them all was the great figure of Charles Darwin, the emancipator of the human mind. Darwin taught man where he came from, what he was, and what he might reasonably expect to be if he studied the great truths of Nature and the laws of her operations. The call of Darwinism was to the unity of all mankind in a struggle to conquer the evils which menaced its existence and destroyed its happiness—disease and war. As the dinner was a special occasion, a father-in-law entertained by his son-in-law, Sir Buckston asked each guest to accept a silver snuff box, and assured them that a daily pinch of snuff reduced the risks of a cold in the head and other respiratory troubles to their minimum.

The following Fellows and Members were present:

Council.—Professor G. Grey Turner and Professor R. E. Kelly (vice-presidents), Mr. Ernest W. Hey Groves, Sir Cuthbert Wallace, Mr. W. Sampson Handley, Mr. Wilfred Trotter, Professor A. H. Burgess, Mr. Victor Bonney, Professor Graham Simpson, Sir James Walton, Sir Alfred Webb-Johnson, Mr. G. Gordon-Taylor, Sir Charles Gordon-Watson, Mr. R. C. Elmslie, Mr. L. R. Braithwaite, Mr. H. S. Souttar, Sir Girling Ball, Mr. Seymour Barling, Mr. C. Max Page, Mr. W. H. Ogilvie, Mr. Cecil P. G. Wakeley, and Mr. L. E. C. Norbury.

Fellows.—Dr. Tom Bates, Mr. Lancelot Bromley, Mr. W. Derrick Coltart, Mr. D. R. Davies, Mr. John Foster, Mr. R. H. Franklin, Sir Francis Fremantle, Mr. R. Affleck Greeves, Mr. H. E. Harris, Mr. Kenneth James, Mr. Geoffrey Jefferson, Mr. R. Scott Mason, Mr. T. W. Mimpriss, Mr. Erichsen S. Page, Professor C. A. Pannett, Mr. Bertram A. Pidcock, Mr. A. McKie Reid, Mr. J. E. H. Roberts, Mr. A. E. Roche, Sir Leonard Rogers, Mr. F. F. Rundle, Mr. A. Simpson-Smith, Mr. A. S. Till, Mr. A. Glandon Williams, and Mr. C. P. Wilson.

Members.—Dr. Heward Bell, Dr. D. E. Bedford, Surgeon Rear-Admiral C. M. Beadnell, Dr. H. E. Blake, Dr. H. E. A. Boldero, Dr. C. P. F. Boulden, Dr. E. L. Bunting, Dr. Judson S. Bury, Dr. Frank Clayton, Mr. T. V. L. Crichlow, Mr. F. N. Doubleday, Dr. F. R. Eddison, Mr. B. J. Frankenberg, Dr. Beaufort Fraser, Dr. S. E. Furber, Dr. T. H. Gardner, Mr. W. Cliff Hodges, Mr. L. D. A. Hussey, Dr. R. C. Jewesbury, Mr. C. E. M. Jones, Dr. W. E. Joseph, Mr. F. G. Layton, Commander Murray Levick, Mr. Windsor Lewis, Mr. A. F. Morcom, Dr. W. D. Newcombe, Mr. E. E. Pochin, Dr. A. F. Potter, Dr. L. W. Proger, Mr. W. Bentley Purchase, Mr. Walton R. Read, Dr. G. R. Rossdale, Dr. Gordon Simpson, Dr. A. W. Stott, Mr. T. Y. Simpson, Mr. W. J. Susman, Dr. J. W. de Witt Gray Thornton, Mr. T. H. E. Taylor-Jones, Dr. P. H. Whitaker, Mr. Cecil Wilson, Sir Charles Wilson, Mr. H. B. Wilson, Dr. J. A. Young, Dr. A. H. Zair.

Also present were Professor R. J. S. McDowall, Professor John Beattie (Director of Research), Mr. Kennedy Cassels (Secretary), Dr. A. J. E. Cave (Assistant Conservator), and Mr. W. F. Davis (Assistant Secretary).

An ordinary council meeting of the Royal College of Surgeons of England was held on November 10, with the President, Mr. Hugh Lett, in the chair.

The following were appointed assessors for the Primary Fellowship examinations to be held over-seas in 1939: at

Lahore, January 2: *Anatomy*, Lieutenant-Colonel F. J. Anderson, *M.C.*, F.R.C.S., I.M.S., professor of surgery in the University of Calcutta; *Physiology*, Lieutenant-Colonel H. S. Anand, M.B., Ch.B.Ed., D.P.H., I.M.S. At Cairo, January 13: *Anatomy*, Professor D. E. Derry, M.B., Ch.B. *Physiology*, Professor Gleb von Anrep, M.D., D.Sc., F.R.C.S.

Dr. A. J. E. Cave was appointed representative of the College on the British National Human Heredity Council, and Mr. C. Max Page on the Fracture Subcommittee of the Voluntary Hospitals Committee for London.

Miss Collard and Dr. H. N. Goadby were appointed Mackenzie Mackinnon Research workers and Mr. G. M. Hill was reappointed for the third year.

Diplomas

Diplomas of Membership and Diplomas in Public Health were granted to the candidates whose names were published in the report of the meeting of the Royal College of Physicians of London in the *Journal* of November 12 (p. 1023).

The following hospitals were recognized under paragraphs 21 and 23 of the Fellowship regulations:

London Homoeopathic Hospital, house-surgeon.

Cornelia and East Dorset Hospital, Poole, recognition extended to July 31, 1941.

The Services

No. 14 STATIONARY HOSPITAL DINNER

The nineteenth annual dinner of the medical officers of No. 14 Stationary Hospital will be held on Thursday, December 8, at the Trocadero Restaurant, Piccadilly, W., at 7.15 for 7.45 p.m., with Colonel C. R. Evans, D.S.O., in the chair. The price of the dinner is 12s. 6d. exclusive of wines. The honorary secretaries are Major-General H. M. Perry and Dr. H. L. Tidy, 39, Devonshire Place, W.1.

Medical Notes in Parliament

The House of Commons this week completed the debate on the Address in reply to the King's Speech and also discussed motions proposed by private members.

New Bills

The Housing (Financial Provisions) (Scotland) Bill was presented on November 9 by Mr. Colville. The same Minister presented on November 10 the Reorganization of Offices (Scotland) Bill. This latter Bill gives effect to the Report presented in 1937 of the Committee on Scottish Administration. The Bill will vest in the Secretary of State for Scotland the functions of the Department of Health for Scotland. One clause provides for the reorganization of the General Board of Control for Scotland.

The Criminal Justice Bill was introduced by Sir Samuel Hoare on November 10. Two of its objects are "to provide new methods and to reform existing methods of dealing with offenders and persons liable to punishment" and "to amend the law relating to the management of prisons and other institutions."

Private Members' Bills were presented in the House of Commons on November 11 by members successful in the ballot. Dates chosen for second reading, titles of Bills, and members introducing are:

November 18, Workmen's Compensation Bill, Mr. Ridley.

November 25, Public Health (Coal Mine Refuse) Bill, Mr. Lawson.

December 9, Workmen's Compensation Acts (1925 to 1934) Amendment Bill (to amend the Workmen's Compensation Acts with respect to miners' nystagmus; to provide for the establishment of medical tribunals of appeal; to make sundry alterations in medical procedure, etc.), Miss Ward.

December 16, Adoption of Children (Regulation) Bill, Miss Horsbrugh.

December 16, Contraceptives (Regulation) Bill (to regulate the public display of contraceptives, etc.), Mr. Simmonds, supported by Sir Francis Fremantle, Sir Joseph Leech, Sir Henry Morris-Jones, Major Neven-Spence, and Dr. Salter.

February 3, Charitable Collections (Regulations) Bill, Mr. Craven-Ellis.

February 3, Voluntary Hospitals (Relief from Rating) Bill, Mr. H. G. Williams.

The text of the Workmen's Compensation Bill, introduced by Mr. Ridley, was issued on November 15. It includes a provision to substitute for medical referees under the Workmen's Compensation Act a medical board appointed in accordance with regulations to be made by the Home Secretary.

Debate on the Address

The debate on the Address in the House of Commons was continued on November 14 on a Labour amendment. Moving this, Mr. PETHICK-LAWRENCE said that the Labour Party welcomed the announcement of the new cancer campaign, but thought that a still more urgent need was to take drastic steps to cure the cancer in the body politic of the State itself. There was an artificial shortage, exclusive of supplies from abroad, a limitation of home output, and, in some cases, a deliberate destruction of food. He paid a tribute to the scientific men who had brought the question of malnutrition to the front. They had done valuable service to mankind, and had made a lasting contribution to the progress of the world. Dr. M'GONIGLE, the medical officer of health for Stockton-on-Tees, who had been engaged on a study of the health of children of the better-off classes compared with that of city children, had said that the latter were five times as great sufferers from anaemia as the children of the professional classes. In the case of bronchial troubles, city children were ten times more liable to disease than children of the professional classes. He had been amazed at the statistics of Sir John Orr with regard to stunted growth. He had shown that if one compared the average height of a large sample of boys taken from the public schools with a similar large sample of boys from the elementary schools there was a difference of no less than six inches between the one and the other. Mortality figures for this country, given in a book published by the League of Nations, showed that the prosperous districts had a corrected death rate 30 per cent. below the average, whereas the poorer districts showed a figure 40 per cent. higher than the average. He did not think that anyone denied that malnutrition was largely responsible for these differences. The Prime Minister, last week, had referred to nutrition, and used words which, if they meant anything, surely meant that one of the main causes of malnutrition was not lack of purchasing power but ignorance and possibly negligence on the part of the mothers in the spending of their money. That was a very comfortable doctrine, but the statements of medical officers did not substantiate it. As he (Mr. Pethick-Lawrence) understood it, the position of the Government in regard to the condition of the people was that it was a question of expenses, and that at the present time when money had to be expended on rearmament there was necessarily a conflict between guns and butter.

THE CANCER CAMPAIGN

Dr. ELLIOT said that the Government proposed shortly to introduce a Bill which would make provision for extended arrangements for the treatment of cancer. They anticipated that modern methods of diagnosis and treatment, either by *x* rays or by operation, would thus be made available to all who suffered from or—and this was an even larger group—who feared this disease. At present only about one-quarter of the cases which might benefit by treatment were receiving treatment on modern lines. Assurances had been received recently that the great research organizations not only would continue their efforts to acquire as much knowledge as possible as to the cause of the disease but would increase them. How to get the early cases to attend the centres was one of the difficulties those administering the schemes would have to face, but, as public opinion had been altered in its attitude towards tuberculosis by national and local schemes, he hoped that people would be persuaded to take advantage of this new scheme, because an early cure would often lead to a complete cure.

Money would be made available to enable the National Radium Trust to acquire more radium, so that the necessary treatment could be given. He had been able to assure the Chancellor of the Exchequer that the life of radium was 2,500 years, making it a fit subject for a small loan. He was at present closely engaged in discussing details of the proposed measure with the various organizations concerned, and he hoped to be able to place the Bill before the House before the Christmas recess.

Referring to nutrition, Dr. Elliot said the number of free solid meals provided by the local education authorities had been more than doubled in the last ten years. The milk-in-schools scheme had proved a success. During last year 200,000 more children had been drinking milk under the scheme, of whom 50,000 or more had been getting it free of charge. There was also the question of the wise choice of food. The injudicious choice of food had done great damage to many sections of the community, and not to the poorer sections alone. A knowledge of the right kind of food, how to choose food, and how to cook food was a very important factor.

Turning to physical education, Dr. Elliot said that new schools and playgrounds were growing up all over the country. The National Fitness Council had now allotted grants amounting to nearly £750,000 to schemes for youth movements, for developing leadership, and for doing by voluntary means what other nations were doing by compulsory means.

With regard to maternal mortality, he had followed with interest the spectacular results that had been obtained by new methods of treatment, but he realized the number and complexity of the problems still calling for investigation. As a result of the Act which the House passed in 1937, nearly 7,500 whole-time midwives were now employed by local authorities in England and Wales, and it had been possible to make orders against any persons who were not certified midwives or registered nurses in forty-four out of 188 areas. In 1937 the maternal mortality rate went down to 3.13, which was a low record.

Mr. COVE said that, reading the reports on nutrition made by the medical officers of health, he got the impression that a large number gave no evidence that they knew the real condition of the nutrition of the children. He might be unfair and unjust, but he got the impression that in some cases at least the reports were written to please the authorities.

Medical News

Air Vice-Marshal Sir David Munro, K.C.B., F.R.C.S.Ed., was elected Rector of St. Andrews University on November 12 with a majority of 118 votes. The other candidate was Admiral of the Fleet Sir Roger Keyes.

The Council of the Royal Society has recommended the following for election as officers at the anniversary meeting on November 30: President, Sir William Bragg; Treasurer, Sir Henry Lyons; Secretaries, Professor A. V. Hill and Professor A. C. G. Egerton; Foreign Secretary, Sir Albert Seward. The following members of the medical profession are among those recommended for election to the Council of the Society: Professor Major Greenwood, Professor John Mellanby, and Professor W. W. C. Topley.

The next course of lectures on tropical hygiene for men and women outside the medical profession proceeding to the Tropics will be given by Mr. H. H. Clay, Professor R. T. Leiper, F.R.S., and Sir Malcolm Watson at the London School of Hygiene and Tropical Medicine, Keppel Street, Gower Street, W.C., from Monday, November 28, to Friday, December 9 (Saturday and Sunday excepted), from 4 to 5 p.m. Applications for admission to the course, the fee for which is £1 1s., should be made to the secretary of the London School of Hygiene and Tropical Medicine.

The British Postgraduate Medical School announces that Professor W. W. C. Topley, F.R.S., will deliver the Kettle Memorial Lecture on "The Place of Pathology among the Medical Sciences" at the London School of Hygiene and Tropical Medicine, Keppel Street, W.C., on Thursday, November 24, at 5 p.m.

The next quarterly meeting of the Royal Medico-Psychological Association will be held at 11, Chandos Street, Cavendish Square, W., on Thursday, November 24, at 2.30 p.m. At 3 p.m. the nineteenth Maudsley Lecture on "A Revaluation of Psychiatry" will be delivered by Professor D. K. Henderson at 26, Portland Place, W.

The annual clinical "At Home" of the Royal Dental Hospital of London will be held on Saturday, November 26, at 3 p.m., and the dinner of the past and present students of the hospital will be held at the Trocadero at 7.30 p.m.

The first winter meeting of the Medical Society for the Study of Venereal Diseases will be held at 11, Chandos Street, W., on Friday, November 25, at 8.30 p.m., when Colonel L. W. Harrison and Dr. Margaret Rorke will speak on "Venereal Disease Control in Scandinavian Countries."

The annual meeting of the British Health Resorts Association will be held at 28, Portland Place, W., to-day (Friday, November 18), at 4 p.m., with the president, Lord Meston, in the chair.

A joint meeting of the Medico-Legal Society and the Section of Psychiatry of the Royal Society of Medicine will be held at 26, Portland Place, W., on Thursday, November 24, at 8.30 p.m., when a discussion on "The Place of the Psychiatrist in Relation to the Administration of the Criminal Law" will be opened by Dr. R. D. Gillespie and Dr. Denis Carroll (for the Royal Society of Medicine) and Mr. Roland Burrows, K.C., Recorder of Cambridge, and Dr. Letitia Fairfield (for the Medico-Legal Society).

In view of recent developments in methods of treatment of respiratory paralysis the London County Council has decided to hold a demonstration of various types of cabinet and other respirators in the conference hall, County Hall, Westminster Bridge, S.E., on Wednesday, November 23. Any members of the medical profession will be welcome to attend the demonstration between the hours of 10 a.m. and 1 p.m. and 2 p.m. and 4 p.m.

The following medical men were elected mayors on November 9: Dr. H. C. Barraclough (Lowestoft); Mr. S. A. Boyd (Hampstead); Dr. W. E. Moore Ede (Worcester); Alderman I. Flack (Radcliffe); Dr. B. Ll. Hodge (Malmesbury); Alderman C. L. Katial (Finsbury); and Dr. R. W. Pearson, *M.C.* (Arundel). Dr. Moore Ede was re-elected.

The King has approved recommendations by the Council of the Royal Society for the award of the two Royal Medals for the current year to Dr. Francis William Aston, in recognition of his discovery of the isotopes of non-radioactive elements; and to Professor Ronald Aylmer Fisher, in recognition of his important contributions to the theory and practice of statistical methods.

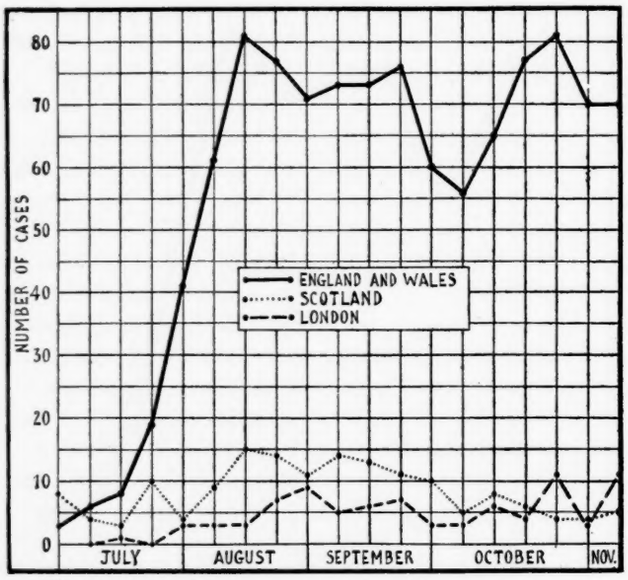
EPIDEMIOLOGICAL NOTES*

Acute Poliomyelitis

The fall in the incidence of poliomyelitis in England and Wales recorded last week has been maintained but not increased, the number notified remaining at 70. In London notifications rose from 4 to 11, and in Scotland from 3 to 5. The counties chiefly affected were London 11 (Battersea, Lewisham, Westminster, and Woolwich 2 each, Chelsea, Kensington, and Wandsworth 1 each); Lancaster 6 (Liverpool 2, Eccles, Lancaster, Manchester, and Urmston 1 each); Essex 5 (Harwich 2, Wanstead, Tendring, Braintree rural 1 each); Glamorgan 5 (Cardiff 2, Penarth 2, Cowbridge rural 1); Lincoln 5 (Gainsborough, Gainsborough rural, South Kesteven, Scunthorpe, Spilsby 1 each); Oxford 4 (Oxford 2, Bullingdon and Witney 1 each); Southampton 4 (Portsmouth 1, Winchester 2, Ringwood and Fordingbridge 1). The 5 cases in Scotland occurred in Lanark County 2, Edinburgh 2, and Dumbarton 1.

* Except where otherwise mentioned, figures in parentheses refer to the week preceding the one under review.

In the accompanying graph are given the numbers notified each week in England and Wales, London, and Scotland respectively from July 3 to November 5. The average number notified weekly in the immediately preceding four-week period was England and Wales 3, London 1, and Scotland between 1 and 2. The rapid rise in incidence in England and Wales suggested an outbreak of greater magnitude than is usual in this country, but by the middle of August it had reached its peak. Contrary to expectation there was a recrudescence of the disease in the early weeks of October, culminating in a second peak in the third week equal in height to the August



Weekly notifications of acute poliomyelitis from July 3 to November 5, 1938.

peak. The occurrence of two periods of maximal incidence of acute poliomyelitis in England and Wales is unusual and may conceivably be related to the abnormal spell of hot dry weather experienced in October. The distribution of the disease at that time was fairly widespread: while Essex remained the chief endemic focus, fresh outbreaks were being reported in Glamorgan, Yorkshire, and Sussex.

In London the same explosive character was not encountered, although there were two periods of maximal prevalence, the first showing a lag period of fourteen days after that of England and Wales and the second coinciding with it. (The height of the second peak for the whole country was largely due to the increase in London.) The incidence curve for Scotland conforms more or less to the London curve, except that there was no recurrence in October save for a trifling rise in the week under review, while its rather flattened peak coincided with that for the whole country, not with that for London.

In Holland the number of cases in the week ended October 29 fell from 33 to 19: of those 11 were in the Province of South Holland (4 in the district of Rotterdam). In France 164 cases were recorded in September, compared with 81 in August and with 105 in September, 1937. In the first fortnight of October 110 cases were reported in Finland as against 92 in the preceding two-week period.

Enteric Fever

In England and Wales notifications of enteric fever rose from 19 to 21 and in London from 1 to 4 (Chelsea 2, Hackney 1, Lewisham 1). While no fresh outbreaks have to be recorded the sporadic cases have occurred over a wide area. Only in three towns—London 4, Liverpool 2, Boston 2—have more than one case been notified during the week. There was one death in the 126 Great Towns (at Croydon). The two cases recorded in Scotland were in Dunfermline and Lanark county and there was one death in Glasgow.

Primary and Influenzal Pneumonia

A slight increase was recorded for England and Wales, 583 as against 578; and for London, 75 as against 65. The main counties affected were: Lancaster 84 (Manchester 31, Liverpool 10); Yorks (West Riding) 51 (Sheffield 19, Leeds 7); London 75 (Poplar 9, Islington 8, Bermondsey 6, St. Pancras and Woolwich 5 each); Warwick 37 (26 in Birmingham); Durham 34 (12 in Sunderland); Stafford 30 (Walsall 5, Wolverhampton 6). Of deaths from influenza in the Great Towns 7 were in London, 3 in Rochdale, and 2 each in Oldham and Walthamstow; of the 272 cases of primary pneumonia in Scotland 183 were in Glasgow. The single death from influenza occurred in Glasgow. Of the 33 inmates of a nursery at Hexham (Northumberland) 6 died from bronchopneumonia and the remainder have been isolated at the Walkergate Isolation Hospital in Newcastle whilst the nursery is being disinfected in readiness for reopening. It has not yet been disclosed what the causative organism was or why the infection was so lethal.

Diphtheria and Scarlet Fever

A small increase in notifications of diphtheria was reported for England and Wales, and a small decrease for London. In Scotland notifications decreased from 274 to 253. Towns chiefly affected were: London 145 (Poplar 16 (13), Islington 19 (9), Southwark 10 (4)), Liverpool 48 (59), Bristol 33 (23), Leeds 31 (19), South Shields 25 (21), Sheffield 26 (37), Birmingham 24 (38), Leicester 22 (15), Manchester 20 (28). Of the 19 deaths in the Great Towns 2 each were in London, Plymouth, and Stoke-on-Trent, and 1 each in Croydon, Bolton, Bournemouth, Bootle, Cheltenham, Leeds, Liverpool, Leicester, Great Yarmouth, Merthyr Tydfil, Sheffield, Smethwick, and West Ham. Of the 4 deaths in Scotland 3 were in Glasgow and 1 in Edinburgh. At the time of going to press reports indicate a continued increase of diphtheria of a virulent type in Glasgow and Bristol. Of the 25 cases notified in South Shields 9 were carriers; there were no deaths during the week (2 in the previous week). To date this year there have been 476 cases of diphtheria with 58 deaths recorded in South Shields.

Notifications of scarlet fever rose from 2,000 to 2,040 in England and Wales, but fell from 192 to 168 in London. In Scotland notifications fell from 411 to 403. The principal towns affected were: Liverpool 62 (50), Manchester 28 (56), Birmingham 38 (29), Bristol 33 (44), Newcastle 29 (14), Leeds 28 (35), Sheffield 25 (37), Nottingham 25 (19), West Ham 22 (18), York 20 (11). Of the 168 cases in London 13 (10) were in Islington, 13 (3) in Stepney, 13 (26) in Wandsworth, 16 (9) in Poplar, and 12 (11) in Battersea. In the Great Towns of both countries there was 1 death (in Edinburgh).

Measles and Whooping-cough

Of the 22 cases of measles notified in London there were 4 each in Stepney and Lambeth and 2 each in Fulham, Westminster, Islington, Shoreditch, and Southwark. The single death recorded occurred at Wolverhampton. Of the 14 cases of measles reported in Scotland 3 were in Orkney. There were no deaths. In London 141 (146) cases of measles were notified, chiefly in Battersea 18, Kensington 11, Southwark 11, Finsbury, Islington, and Hackney 10 each. There were 4 deaths (1 each in London, Heston and Isleworth, Reading, and Leicester). In Scotland notifications rose from 178 to 203, of which 158 (134) were in Glasgow, 15 (12) in Lanark county, 11 (4) in Edinburgh, and 11 (6) in Paisley. There was one death in Glasgow.

Cholera and Plague

During the week under review there were 418 (568) cases of cholera and 229 (282) deaths in the Central Provinces of India, 324 (270) cases and 136 (128) deaths in Bombay Presidency, and 104 (218) cases and 51 (97) deaths in the United Provinces.

In India during the same week there were 155 (43) cases of plague and 13 (6) deaths in the Central Provinces, 30 (47) cases with 15 (23) deaths in Bombay Presidency, 17 (11) cases and 17 (8) deaths in Madras Presidency, and in Burma 43 (67) cases with 31 (65) deaths.

No. 44

INFECTIOUS DISEASES AND VITAL STATISTICS

We print below a summary of Infectious Diseases and Vital Statistics in the British Isles during the week ended November 5, 1938.

Figures of Principal Notifiable Diseases for the week and those for the corresponding week last year, for : (a) England and Wales (London included). (b) London (administrative county). (c) Scotland. (d) Eire. (e) Northern Ireland. Median values for the last 9 years for (a) and (b).

Figures of Births and Deaths, and of Deaths recorded under each infectious disease, are for : (a) The 126 great towns (124 in 1937) in England and Wales (including London). (b) London (administrative county). (c) The 16 principal towns in Scotland. (d) The 13 principal towns in Eire. (e) The 10 principal towns in Northern Ireland.

A dash — denotes no cases ; a blank space denotes disease not notifiable or no return available.

Disease	1938					1937 (Corresponding Week)					1929-37 (Median Value Corresponding Weeks)	
	(a)	(b)	(c)	(d)	(e)	(a)	(b)	(c)	(d)	(e)	(a)	(b)
Cerebrospinal fever	13	3	7	2	—	8	1	6	2	1		
Deaths		—	1				1	—				
Diphtheria	1,457	145	253	88	23	1,698	220	295	61	50	1,276	220
Deaths	19	2	8	2	—	42	5	8	—	1		
Dysentery	34	9	15		—	118	20	45		—		
Deaths				—	—				—	—		
Encephalitis lethargica, acute	4	—	2	—	—	4	1	2	—	—		
Deaths		—					—					
Enteric (typhoid and paratyphoid) fever	21	4	2	6	2	36	3	2	5	2	34	
Deaths	1	—	1	—	—	—	—	—	—	—		
Erysipelas			80	10	7			96	9	5		
Deaths		1					1					
Infective enteritis or diarrhoea under 2 years	33	12	6	3	5	44	11	10	2	10		
Deaths												
Measles		26	14		1			160		33		
Deaths	1	—	—	—	—	18	—	1	—	—		
Ophthalmia neonatorum	82	9	20		—	86	8	29		—		
Deaths												
Pneumonia, influenzal†	583	75	6	4	5	812	79	8		2	816	79
Deaths (from Influenza)	37	7	1	2	1	38	6	5	1	—		
Pneumonia, primary			272	9				329	4			
Deaths		19		16	10		13		14	9		
Polio-encephalitis, acute	3	—				1	—					
Deaths		—					—					
Poliomyelitis, acute	70	11	5	—	—	26	—	1	—	2		
Deaths		1					—					
Puerperal fever	5*	5	13	3	—	5*	5	20	1	1		
Deaths		—					—					
Puerperal pyrexia	155	7	22		5	180	18	22		—		
Deaths												
Relapsing fever	—	—			—	—	—	1		—		
Deaths												
Scarlet fever	2,040	168	403	83	111	2,574	202	652	114	114	2,588	347
Deaths	—	—	1	—	—	2	—	1	—	—		
Small-pox	—	—	—		—	—	—	—		—		
Deaths	—	—		—	—	—	—		—	—		
Typhus fever	—	—	—	—	—	—	—	—	—	—		
Deaths				—	—				—	—		
Whooping-cough		141	203		9			65		5		
Deaths	4	1	1	1	—	8	1	1	—	1		
Deaths (0-1 year)	267	40	65	33	23	313	41	86	27	26		
Infant mortality rate (per 1,000 live births)	44	33				52	34					
Deaths (excluding stillbirths)	4,380	841	617	207	144	4,455	867	656	153	149		
Annual death rate (per 1,000 persons living)	10.8	10.7	12.6	14.0	12.8	11.0	10.9	13.4	10.4	13.2		
Live births	6,677	1,275	836	257	204	6,474	1,134	810	302	225		
Annual rate per 1,000 persons living	16.4	16.2	17.0	17.4	18.1	16.0	14.3	16.6	20.6	19.9		
Stillbirths	266	36				287	49					
Rate per 1,000 total births (including stillborn)	38	27				42	41					

* After October 1, 1937, puerperal fever was made notifiable only in the administrative county of London.

† Includes primary form in figures for England and Wales, London (administrative county), and Northern Ireland.

Letters, Notes, and Answers

All communications in regard to editorial business should be addressed to THE EDITOR, BRITISH MEDICAL JOURNAL, B.M.A. HOUSE, TAVISTOCK SQUARE, W.C.1.

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QUERIES AND ANSWERS

Case for Diagnosis

Dr. E. S. HAWKES (Budleigh Salterton) writes: I should be grateful for any suggestions as to diagnosis and treatment of the following case. A schoolgirl aged 16¾ years has for ten months been running a temperature of 99.2° to 100.2° F. about the middle of the day; the temperature then drops to about normal. There are no other physical signs, except a slight decrease in superficial and deep reflexes. The girl looks ill and has extreme lassitude. I am quite satisfied that there is no question of neurasthenia. A consultant physician and a skilled pathological examination failed to reveal any sign of disease; yet the girl is obviously ill.

Varicose Veins

"M.E.D." writes: A female patient of mine has had large varicose veins in both legs injected on about twelve occasions without any result. The solution used was quinine and urethane. Can anyone suggest the reason for this, and if it would be advisable to try some other solution?

Cattle Ringworm in Man

Dr. E. S. HAWKES (Budleigh Salterton) writes in reply to Dr. Stewart (*Journal*, November 12, p. 1027): Most of these cases can be cleared with ung. cuprosal (Duncan Flockhart and Co.). More severe lesions, with secondary sepsis, should be cleaned with frequent applications of eusol by day, the ointment being used at night. The only case that I have had that failed to respond to this treatment yielded to ultra-violet irradiation in increasingly strong doses.

Protection of Eczematous Face

Dr. R. V. MONAHAN (Navan) writes in reply to Dr. D. Braham (*Journal*, November 12, p. 1027): I would suggest that a close study of these cases will in most instances reveal some evidence of a lack of thyroid secretion—dandruff, dry or falling hair, outer half of eyebrows missing or badly nourished; dry, pale, thick, inelastic skin; slow pulse, etc. These patients will do remarkably well when the deficiency is corrected and they are kept on a maintenance dose of thyroid. I give them a three-weeks course, repeated indefinitely with an interval of one week between each course. The necessary dose of thyroid varies, but the pulse rate should be pushed to the region of 80 a minute and should never be allowed to exceed 90 a minute. A daily dose of 5 to 10 grains of fresh gland extract will usually be sufficient; later, when the symptoms of eczema have disappeared, a smaller dose will suffice to keep the patient at a normal level; possibly 1 or 2 grains a day will be ample.

LETTERS, NOTES, ETC.

A Jubilee Volume

We have received from Bayer Products Ltd. a copy of a jubilee volume entitled *Fifty Years (1888–1938) of Bayer Remedies.* The volume is beautifully produced and the illustrations are particularly noteworthy. Much information of general historical medical interest is given regarding the development of the synthetic drugs which to-day are of such dominant importance in therapeutics. The development in this field has been so rapid that everyone has been too busy testing new discoveries to spare time to write the history of their origin. This volume contains many interesting notes regarding the early work of Behring and of Ehrlich, laboratory notes on the discovery of plasmoquine and atebrin, the struggle attending the introduction of local anaesthesia, etc. Phenacetin was the first synthetic preparation introduced into medical science bearing the name of Bayer, and it is an interesting fact that only fifty years separates these early stages of synthetic organic drugs from the recent triumphs of organic chemistry in the synthesis of vitamins and hormones.

Tuberculosis and Post-partum Haemorrhage

Dr. J. M. MACPHAIL (Middlesbrough) writes: I have noted that women who are not themselves tuberculous but who belong to a tuberculous family readily succumb to post-partum haemorrhage, or puerperal septicaemia, a short time after a confinement. To all appearances they may have been in perfect health, and this makes their deaths all the more tragic. I refer here not to the patients with an acute pleurisy which is the beginning of an acute tuberculosis, but to the apparently healthy young women who suddenly and unexpectedly succumb. Those who scoff should remember that irregular menstruation is very common in young tuberculous people.

Diagnosis of Malaria

Dr. J. E. FOLEY (Sandown) writes: We have all our own methods for the diagnosis and treatment of malaria, but I would like to stress the importance of not placing too much faith in a negative blood slide and of remembering that each attack must be followed up with adequate treatment, irrespective of how much annoyance, unpopularity, and criticism one lays oneself open to. In cases in which a blood film is negative quinine is too often withheld or not given in adequate dosage. We have specific remedies for malaria, and it is of the utmost importance that these drugs should be administered as early as possible: malaria is, in fact, our most urgent medical emergency in the East.

Choice of Careers

The Ministry of Labour has published new editions of the pamphlets on Librarianship (No. 11), Nursing (No. 17), and Secretarial Work for Women (No. 19), which are part of the series entitled *Choice of Careers* compiled by arrangement with the Incorporated Association of Headmasters and Headmistresses of Public Secondary Schools. Each of the pamphlets sets out the nature of the work, the qualifications needed, the methods and cost of training, and the prospects in the various branches of the occupation. They may be obtained from H.M. Stationery Office or through any bookseller, price 3d. (Nos. 3, 11, and 19) and 4d. (No. 17).

The Ostermilk Book

The Glaxo Laboratories, Ltd., of Greenford, Middlesex, announce a new and revised edition of *The Ostermilk Book*, the third since its first appearance just over eighteen months ago. It is intended for the guidance of mothers in the care of themselves and their infants. Copies of the book will be sent on request to any medical practitioner.

Corrigendum

Surgeon Lieutenant S. GAY FRENCH, R.N., writes: I much regret that through an error of typing the paper by Surgeon Lieutenant-Commander Horan and myself published in the *Journal* of November 5 (p. 942) was headed "Sulphonamide in the *Treatment* of Acute Mastoiditis." As the context of the paper shows, the heading should have been "Sulphonamide in the *Prevention* of Acute Mastoiditis." We know of no treatment of the acute disease, except the usual surgical measures. I apologize to any reader whom this error may have misled.